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# NEMATODES OF FOREST TREES

ANNOTATED BIBLIOGRAPHY NO. 27

COMMONWEALTH INSTITUTE OF HELMINTHOLOGY

# Nematodes of Forest Trees

## 1960

1 BASSUS, W., 1960. "Der Einfluss der Kalkdüngung auf die Fauna des Waldbodens." *Arch. Forstw.*, 9 (12), 1065–1081. [English & Russian summaries p. 1080.]

The influence of liming on fauna of forest soil is reported. Nematode populations increased, in some cases, significantly. [From English summary.] D.W.L.

2 –LVOVA, K. A., 1960. [Plant nematodes of young forest plantations in the Gorkov region.] *Uchen. Zap. gorkov. gos. pedagog. Inst.*, No. 27, (*Gel'mint. Sb.* No. 2), pp. 160–169. [In Russian.]

## 1962

3 —BASSUS, W., 1962. "Ergebnisse faunistisch-ökologischer Untersuchungen an Waldbodennematoden. (Vorläufige Mitteilung)." *Wiss. Z. Humboldt-Univ. Berl.*, 11 (2), 329.

4 —CESNIK, R., 1962. "Nematódeos em essências florestais." *Revta Agric., S Paulo*, 37 (4), 181–187.

Nematodes from the roots of forest trees and surrounding soil are listed under the hosts. Trials with D-D, Nemagon, Dowfume W-85, and Dowfume MC-2 are briefly recorded. D.W.L.

## 1963

5 -ALTHERR, E., 1963. [Nematodes of subalpine forest soils in the Dischma Valley (Grisons).] "Nématodes des sols forestiers subalpins du Val Dischma (Grisons)." *Bull. Soc. vaud. Sci. nat.*, 68 (312), 333–349.

Free-living nematodes of 15 genera were recovered from soil samples from 4 locations in a sub-alpine valley at an altitude of 2,000 m. in Switzerland. A few specimens of *Tylenchus* spp. and *Aphelenchoides ?parietinus* and large numbers of *Rotylenchus robustus* were also found. *R. robustus* was dominant in all 4 locations. *Eudorylaimus leptosoma* n.sp., *E. maksymovi* n.sp. and *Enchodelus hopedoroides* n.sp. are described. *Heterodorus* is synonymized with *Enchodelus*, [this was also done by J. B. Goodey, 1963 in "Soil and freshwater nematodes"] and *H. magnificus* becomes *E. magnificus* n.comb. and is described. M.T.F.

6 —SIDDIQI, M. R., 1963. "*Boleodorus pakistanensis* n.sp. (Nematoda: Tylenchida), found associated with pine roots in Abbottabad, Pakistan." [Correspondence.] *Sci. Cult.*, 29 (11), 562–563.

*Boleodorus pakistanensis* n.sp. from around the roots of *Pinus excelsa* in Abbottabad, West Pakistan, has the dorsal oesophageal gland orifice ⅓ of a spear length behind the spear base, more posterior than in other described species of *Boleodorus*. It differs from *B. thylactus* in a more posterior vulva, reduced spear knobs and a ventrally arcuate tail. *B. indicus* is moved to the genus *Neotylenchus*, and *Nothotylenchus innuptus* to *Boleodorus*. S.C.C.

## 1964

7 –ADAMS, R. E., 1964. "The use of fumigants in a forest tree nursery." [Abstract.] **Nematologica, 10** (1), 65.

Several nematicides were tried against ectoparasitic nematodes associated with poor growth of conifer seedlings. Methyl bromide and Vapam were equally effective as soil fumigants and gave considerably increased yields of trees. C.E.T.

8 -BASSUS, W., 1964. "Zur Bodenfauna degradierter Kiefernbestände." *Pedobiologia*, 3 (4), 245–255. [English summary p. 255.]

9 –HANSBROUGH, T., HOLLIS, J. P., MERRIFIELD, R. G. & FOIL, R. R., 1964. "Fumigation of loblolly pine planting sites." **Plant Disease Reporter,** 48 (12), 986–989.

To determine the effects of fumigation against nematodes and fungi on the growth and development of loblolly pine at Homer, Louisiana, U.S.A., planting sites were treated with 30 gal. of D-D per acre, with 98% methyl bromide with 2% chloropicrin (MC-2) at the rate of 2 lb. per 100 sq. ft., or were not fumigated; all were planted with seedlings from nursery beds, half of which had been fumigated with D-D. The nursery treatment had no effect on tree survival, but resulted in a consistent reduction in seedling growth. Seedlings grown on the MC-2 fumigated planting sites, where the chemical had killed grasses and weeds, were significantly taller than on other sites; those fumigated with D-D showed significantly lower survival values. The average number of plant nematodes per pint of soil in sites not fumigated was 64 in January and 5 in June. Comparative figures for D-D fumigated soil were 10 and 39, and for MC-2 fumigated soil, 4 and 10. S.C.C.

10 –SCOGNAMIGLIO, A., 1964. "Ricerche nematologiche in vivai di piante forestali dell' Abruzzo." **Progresso Agricolo. Bologna, 10** (5), 513–522. [English summary p. 522.]

In the Abruzzo, Italy, samples of soil from tree nurseries, where soil exhaustion was observed, contained many species of nematodes. These are listed according to district, to host and whether found on roots or in the soil. D-D, Telone, Vorlex and methyl bromide are recommended for application to the bare soil before sowing or transplanting; Neosan, Nemafos 10, Nemafos 25E or Nemafos 46E are recommended for application to the rows of older tree seedlings during spring and summer and for the following 2 years as well. L.E-L.

11 –SIDDIQI, M. R., 1964. "Six new nematode species in the superfamily Dorylaimoidea from India." *Labdev J. Sci. Technol.*, 2 (2), 136–144.

Siddiqi describes from India *Tylencholaimus hastatus* n.sp., *Diphtherophora parva* n.sp., *Tylencholaimellus projectus* n.sp., *Axonchium indicum* n.sp., *Dorylaimellus digitatus* n.sp. and *D. capitatus* n.sp. *Tylencholaimus hastatus* (one female) from soil around roots of *Pinus longifolia* at Almora, North India, is 0·76 mm. long, the spear and spear extension measure 13 μ and 15 μ respectively, only the posterior gonad is present and the tail is

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dorsally convex-conoid with the terminus dorsally bent, about 4 anal body-widths long. *Diphtherophora parva* (3 females) collected from Ranikhet (U.P.) in soil around roots of *Prunus armeniaca* is 0·36 to 0·42 mm. long, the lip region is continuous with the body contour, the spear measures 17 μ, the tail is dorsally convex-conoid with the terminus subdigitate, about 1½ anal body-widths long. *Tylencholaimellus projectus* (one female) from soil around roots of grass at Kareli (M.P.) is 0·79 mm. long, the head has an unsclerotized disc-shaped structure, the spear measures 13 μ and the spear extension 8 μ, the anterior uterine sac is 1¾ body-widths long, the tail is rounded and one anal body-width long. *A. indicum* (5 females), collected from Thana (Maharashtra) from soil around roots of diseased banana plants, is 1·20 to 1·55 mm. long, the spear measures 7 μ, the oesophagus is enlarged slightly anterior to the middle, the length of the anterior uterine sac is about 4 body-widths, the tail is hemispheroid and two-thirds as long as the width of the body at the anus. *Dorylaimellus digitatus* (one female), collected from Jabalpur (M.P.) from soil around roots of *Mangifera indica*, is 0·67 mm. long, the spear extension is twice as long as the spear, the enlarged portion of the oesophagus is less than half the oesophageal length, the gonads are paired, the tail conoid and the terminus digitate. *D. capitatus* (10 females) from soil around roots of *M. indica* at Kareli (M.P.) is 0·58 to 0·65 mm. long, the head bears a labial disc, the spear is 4 to 5 μ long and the spear extension about twice as long as the spear, the oesophagus is enlarged near the middle of its length, the gonads are paired, the tail is convex-conoid with the terminus blunt, about 2 anal body-widths long. M.S.J.

12 –SUTHERLAND, J. R. & ADAMS, R. E., 1964. "Host range of *Tylenchorhynchus claytoni* on some forest nursery seedlings." [Abstract.] **Phytopathology, 54 (7), 749.**

Nursery seedlings tested to determine the host range of *Tylenchorhynchus claytoni* showed decreasing suitability as hosts in the following order: multiflora rose, red spruce, Japanese larch, black locust, Scotch pine, eastern larch, Norway spruce, shortleaf pine, Virginia pine, chestnut oak, white pine and autumn olive. From the original inoculum of 50 nematodes per pot, the population means after 6 months ranged from 25,790 per pot on the best host to 150 on the poorest. K.C.S.

## 1965

13 –BARKER, K. R. & GRIFFIN, G. D., 1965. "The distribution of nematodes in jack and red pine plantations and the parasitism of *Xiphinema americanum* on jack pine." [Abstract.] *Nematologica*, **11** (1), 33–34.

14 –COLBRAN, R. C., 1965. "Studies of plant and soil nematodes. 10. *Paratylenchus coronatus* n.sp. (Nematoda: Criconematidae), a pin nematode associated with citrus." *Qd J. agric. anim. Sci.*, **22** (3), 277–279.

*Paratylenchus coronatus* n.sp., from soil around *Baloghia lucida* in Queensland, is characterized by the presence of a labial ridge similar to that of *P. arculatus*, a stylet 31·2 to 38·9μ long in females and absence of stylet in males. *P. coronatus* was also collected from around *Pinus elliottii* and orange trees. S.C.C.

15 –HEYNS, J., 1965. "Four new species of the genus *Xiphinema* (Nematoda: Dorylaimoidea) from South Africa." *Nematologica*, **11** (1), 87–99. [French summary p. 99.]

4 new species of *Xiphinema* are described and figured including details of their juvenile stages. *X. clavatum* n.sp., from marshy areas in the Bizana district in the Transkei, is close to *X. rotundatum* from which it differs in the absence of an organ Z, the shape of the female tail which is hemispherical to slightly clavate and the presence of males with a hemispherical tail. It differs from *X. yapoense* in a relatively longer and differently shaped tail and the flatter lip region which is not offset by a constriction. The odontostyle is 119 (107–127) μ long plus an extension 78–90 μ long. In *X. pini* n.sp., from about the roots of unthrifty *Pinus patula* at Sabie, Transvaal, the tails of both sexes are subhemispherical with a slight protuberance at the terminus. It is distinguished from *X. yapoense*, *X. mammillatum* and *X. turicum* by the presence of an organ Z which has 3 or 4 sclerotized ridges projecting into its lumen in each gonad of the females; from *X. rotundatum* by a relatively shorter tail and a shorter odontostyle which is 101–113 μ long plus an extension 73–86 μ long; from *X. ingens* by its smaller size L=3·09–3·58mm., and shorter spear. *X. imitator* n.sp. from a grassy hill near Sordwana Bay, Zululand, is closely related to *X. pini* but is smaller, 1·95–2·63mm. long, and the organ Z contains a fairly large number of irregularly shaped dark granules. The odontostyle is 84 (74–101) μ long plus an extension 60–67 μ long. The spicules are 45 μ long compared with 53–56 μ in *X. pini*. Both sexes in *X. zulu* n.sp., from about the roots of *Acacia xantophloea* in Northern Zululand, have a dorsally convex ventrally concave tail 3 to 4½ anal-body-widths long. The posterior half of the tail consists of a narrow cylindroid non-protoplasmic tip with a rounded terminus. It is distinguished from *X. nigeriense*, the only other species with a similar shaped tail, by its larger size, L=2·96–3·47mm., and its relatively shorter tail. D.J.H.

16 –JAIRAJPURI, M. S., 1965. "Three new species of the genus *Tylencholaimus* de Man, 1876 (Nematoda: Dorylaimoidea) from India." **Nematologica, Year 1964, 10** (4), 512–518. [German summary p. 518.]

3 species of *Tylencholaimus* are described and figured from females only. *T. viduus* n.sp., from about the roots of *Pinus* sp. at Simla, has amphidelphic gonads, a short round tail and is 1·4–1·8 mm. long; it is distinguished from *T. teres* by its longer body, longer spear and extension, and more anteriorly located vulva. *T. similis* n.sp., from about the roots of *Saccharum ravennae* at Aligarh, is 0·72–0·82 mm. long, has a prodelphic gonad and a long ventrally hooked tail; it is distinguished from *T. stecki* by its shorter body, longer ventrally hooked tail and more anteriorly placed vulva. *T. obscurus* n.sp., from about the roots of *Prunus communis* at Saharanpur, is 0·65–0·85 mm. long, has a prodelphic gonad and a convex conoid tail about an anal-body-width long. The measurements of *T. teres* and *T. nanus* from India are also given and a key to females of 11 species of *Tylencholaimus*. *T. brevicaudatus* is considered a synonym of *T. nanus*. *T. kirifuri*, *T. nikkoensis*, *T. zeelandicus* and *T. zimmermanni* are regarded as *species inquirendae* because of their inadequate descriptions. D.J.H.

17 -LEISER, A. T. & FERRIS, J. M., 1965. "Tolerances of *Picea* spp. to a nematocide and fertilizer salts." *Pl. Dis. Reptr*, 49 (1), 72–73.

The injury and death of spruce trees (*Picea pungens glauca* and *P. abies*) treated with previously determined "safe" concentrations of DBCP are attributed to the combined effects of fertilizer salts and the nematicide. D.N.G.

18 —MAESENEER, J. DE & BRANDE, J. VAN DEN, 1965. "Chemische bestrijding van een *Rotylenchus-Trichodorus* kompleks in de boomkwekerij." *Meded. LandbHoogesch. OpzoekStns Gent*, 30 (3), 1454–1460. [English, French & German summaries pp. 1459–1460.]

D-D and chloropicrin at 6 litres per 100 sq. m. decreased the population of *Rotylenchus robustus* and *Trichodorus* sp. to an undetectable level down to 40 cm. in sandy, nursery soil. Basamid [dazomet] at 3 kg. per 100 sq.m. was less effective than either D-D or chloropicrin down to 20 cm. and ineffective at 30-40 cm. depth. *Acer platanoides, A. pseudoplatanus, Cotoneaster simonsii, Crataegus oxyacantha, Fagus sylvatica, Prunus avium, P. insititia syriaca, Pinus laricio corsicana* and *Sorbus aucuparia* showed considerable growth increases on treated plots; *Rosa canina*, on the contrary, did not. D.W.L.

19 —RUEHLE, J. L., 1965. "Host range studies of several plant-parasitic nematodes found in southern pine forests." [Abstract.] *Nematologica*, 11 (1), 45.

20 —SUTHERLAND, J. R., 1965. "Nematodes associated with coniferous nursery seedlings in Quebec." *Phytoprotection*, 46 (3), 131–134.

The nematodes listed from soil of the Berthierville, Normandin and Proulx forest nurseries, Quebec, Canada, include *Pratylenchus* sp., *Criconemoides* sp., *Paratylenchus* sp., *Meloidogyne* sp. and *Trichodorus* sp. *Pratylenchus* sp. was most numerous and widespread. D.W.L.

21 -SUTHERLAND, J. R. & ADAMS, R. E., 1965. "The parasitism of red pine and other forest nursery crops by *Tylenchorhynchus claytoni* Steiner." *Nematologica*, Year 1964, 10 (4), 637–643. [French summary p. 643.]

*Tylenchorhynchus claytoni* was parasitic on red pine seedlings but in sterile soil caused no significant changes in plant size or weight even at inoculation levels greater than normal field population density. The numbers of nematodes increased in proportion to the initial inoculum level. Multiplication occurred on twelve species of tree and shrub seedlings grown in pots. The nematodes fed gregariously and reproduced on red pine roots growing in agar plates but failed to develop on red pine callus tissue. The only apparent damage was a disorganization of the root-cap cells. J.E.P.

22 —WU, L. Y., 1965. "Five new species of *Criconemoides* Taylor, 1936 (Criconematidae: Nematoda) from Canada." **Canadian Journal of Zoology**, 43 (1), 203–214.

Five new species of *Criconemoides* are described and figured from Canada. *C. bakeri* n.sp., from around *Thuja occidentalis* at Antrim, Ontario, resembles *C. annulatum* but the head region is not set off by a constriction, the anterior vulvar flap is slightly lobed and there are 70 to 79 body annules. *C. petasus* n.sp., from around *Fagus grandifolia* at Osgoode, Ontario, resembles *C. annulifer* but has no basal cephalic annule, the spear is shorter and the body annules are well separated by incurvations. *C. hemisphaericaudatus* n.sp., from around *Picea glauca* and 3 other tree species in Bow River Forest, Calgary, Alberta, and from tufted grass, willow and soil of Ellesmere Island in the Arctic, somewhat resembles *C. simile* but has a greater number of body annules, the excretory pore is more posterior and the vulvar flap is simple. *C. rotundicaudatus* n.sp., from around *Oplopanax horridus* and 7 other tree species in Alberta and British Columbia, resembles *C. annulatum* but differs in having the first 2 annules not set off by a constriction, the first few annules are usually packed together, and the vulvar lip is usually simple and inconspicuous. It differs from *C. simile* in having a longer spear, more annules, the excretory pore more posterior and the anterior vulvar lip simple. *C. quasidemani* n.sp., from around *Betula papyrifera* at Baie St. Paul, Quebec, resembles *C. demani* but the excretory pore is more posterior, the second annule is not thicker than the first and the caudal half of the tail is attenuated. It differs from *C. princeps* in having a greater number of body annules, a shorter spear, more slender tail and the absence of cuticular patches on the lateral aspect. Males of *C. hemisphaericaudatus* and *C. rotundicaudatus* were present; they are unknown for the other 3 new species. A.D.B.

## 1966

23 —CORBETT, D. C. M., 1966. "Central African nematodes. II. *Paratylenchus crenatus* n.sp. (Nematoda: Criconematidae) from Malawi." *Nematologica*, 12 (1), 101–104. [French summary p. 104.]

*Paratylenchus crenatus* n.sp. is described from soil around the roots of unhealthy *Pinus taeda* in Malawi. The females differ from other species of *Paratylenchus* in the number of head annules, in the markedly protruding vulval lips and in the crenate or tuberculate markings on the annules and lateral field. J.E.P.

24 —RIFFLE, J. W. & LUCHT, D. D., 1966. "Root-knot nematode on ponderosa pine in New Mexico." *Pl. Dis. Reptr*, 50 (2), 126.

This is believed to be the first record of root-knot nematode on *Pinus ponderosa*. All stages were dissected from hypertrophied mycorrhizal rootlets from declining trees in the Gila National Forest, New Mexico, U.S.A. The perineal pattern of adult females indicate that this is an undescribed species. A description is planned on the completion of host range tests. D.W.L.

25 —RUEHLE, J. L., 1966. "Nematodes parasitic on forest trees. I. Reproduction of ectoparasites on pines." *Nematologica*, 12 (3), 443–447. [German summary p. 446.]

Seedlings of 9 species of pines native to the southeastern U.S.A. were grown in pots in the glasshouse and inoculated with 5 different species of ectoparasitic nematodes. Population increase after 9 months indicated a positive host-parasite relationship for a given nematode-pine combination. *Criconemoides xenoplax, Hemicycliophora vidua, Helicotylenchus dihystera, Tylenchorhynchus claytoni* and *Trichodorus christiei* parasitized and reproduced on at least 5 of the species tested. *Pinus taeda, P. clausa, P. elliottii* var. *elliottii* and *P. echinata* were hosts for all 5 nematodes. [A.S.] D.W.L.

26 —SHER, S. A., 1966. "Revision of the Hoplolaiminae (Nematoda). VI. *Helicotylenchus* Steiner, 1945)." *Nematologica*, 12 (1), 1–56. [French summary p. 55.]

***Helicotylenchus dihystera, H. multicinctus, H. erythrinae, H. pseudorobustus, H. africanus, H. platyurus,***

*H. digonicus*, *H. canadensis*, *H. concavus*, *H. serenus*, *H. indicus*, *H. tunisiensis*, *H. retusus*, *H. digitatus*, *H. aegyptiensis*, *H. vulgaris*, *H. paxilli* and *H. varicaudatus* are redescribed. 10 new synonyms are proposed. The following new species are described and figured: *H. lobus* n.sp. from soil around roots of *Veratrum californicum* and *Pinus ponderosa* in California; *H. crenacauda* n.sp. from soil around roots of *Oryza sativa* in Indonesia; *H. longicaudatus* n.sp. from soil around roots of *Imperata cylindrica* and *Sporobolus pyramidatus* in Nigeria; *H. microcephalus* n.sp. from soil around the roots of *Elaeis guineensis* in Nigeria; *H. canalis* n.sp. from jungle soil in Ceylon; *H. leiocephalus* n.sp. from soil around unknown grass in South Dakota; *H. rotundicauda* n.sp. from soil around the roots of *Cynodon dactylon* in California; *H. cavenessi* n.sp. soil from around roots of *Manihot utilissima* in Nigeria; *H. caroliniensis* n.sp. from swamp soil in South Carolina; *H. martini* n.sp. from soil around the roots of *Thea sinensis* in Southern Rhodesia; *H. exallus* n.sp. from *Triticum aestivum* soil in South Dakota; *H. hydrophilus* n.sp. from swamp soil in South Carolina; *H. californicus* n.sp. from soil around roots of *Tamarix pentandra* in California; *H. nigeriensis* n.sp. from bush soil in Nigeria; *H. dolichodoryphorus* n.sp. from virgin forest soil in Nigeria; *H. anhelicus* n.sp. from soil around the roots of *Salix* sp. in California; *H. minzi* n.sp. from soil around the roots of *Citrus* sp. in Israel; *H. belli* n.sp. from soil around the roots of *Cedrus* sp. in Utah; *H. labiodiscinus* n.sp. from soil in uncultivated woods in Virginia; *H. clarkei* n.sp. from uncultivated soil around the roots of *Pinus cembroides* and *Pinus* sp. in New Mexico. *H. steueri*, *H. neoformis* and *H. intermedius* are excluded from the genus *Helicotylenchus*. A key to the species is given. J.E.P.

27 –SUTHERLAND, J. R. & ADAMS, R. E., 1966. "Population fluctuations of nematodes associated with red pine seedlings following chemical treatment of the soil." *Nematologica*, 12 (1), 122–128. [French summary p. 127.]

The most prevalent plant nematodes associated with *Pinus resinosa* seedlings in Virginia, U.S.A., were *Paratylenchus* sp., *Hoplolaimus galeatus* and a *Trichodorus* sp. D-D mixture, methyl bromide, Nemagon and Vapam were evaluated for their effectiveness to control the nematodes. Only methyl bromide was satisfactory. A species of *Eucephalobus* was the commonest nonstylet-bearing nematode, while a *Mononchus* sp. was the predominant predacious nematode. J.E.P.

## 1967

28 –DONALDSON, Jr., F. S., 1967. "*Meloidogyne javanica* infesting *Pinus elliottii* seedlings in Florida." *Pl. Dis. Reptr*, 51 (6), 455–456.

*Meloidogyne javanica* is newly recorded from older roots of *Pinus elliottii*. The nematodes were closely associated in the roots with mycorrhizae. J.E.P.

29 –ELIAVA, I. Ya., BAGATURIYA, N. L. & KALANDADZE, L. Sh., 1967. [Study of the nematode fauna of the soil and leafmould of a deciduous forest.] In: [Helminth fauna of animals and plants in the Georgian SSR.] *Tibilisi: Izdatelstvo "Metsniereba"*, pp. 105–110. [In Russian.]

30 –GUBINA, V. G., 1967. [Nematodes of coniferous seedlings in forest nurseries. (Literature review.)] *Trudy gel'mint. Lab.*, 18, 15–21. [In Russian.]

31 –HOGEWIND, W. L. & HEYNS, J., 1967. "Notes on the genus *Isolaimium* Cobb, 1920 (Nematoda), with descriptions of new species from South Africa." *Proc. helminth. Soc. Wash.*, 34 (1), 20–26.

*Isolaimium papillatum* of Andrássy, 1962 (nec *I. papillatum* Cobb, 1920) is renamed *I. andrassyi* nom.nov. because the transverse striae on the front part of the body are much less distinct and closer together than those of *I. papillatum* Cobb. *I. africanum* n.sp. from soil of *Pinus patula* and *Eucalyptus saligna* plantations near Sabie, Transvaal, differs from *I. papillatum* and *I. andrassyi* in having longitudinal striae on the surface of the cuticle. *I. multistriatum* n.sp. from soil about the roots of maize in the Clocolan District of Orange Free State, South Africa, closely resembles *I. africanum* but has more longitudinal striae, a differently shaped tail and a more confluent head. *I. incus* n.sp. from soil about the roots of maize in the Bothaville district, Orange Free State, differs from all other species of the genus in having an expanded lip region. D.W.L.

32 –HUHTA, V., KARPPINEN, E., NURMINEN, M. & VALPAS, A., 1967. "Effect of silvicultural practices upon arthropod, annelid and nematode populations in coniferous forest soil." *Annls zool. fenn.*, 4, 87–145.

33 –KREBILL, R. G., BARKER, K. R. & PATTON, R. F., 1967. "Plant-parasitic nematodes of jack and red pine stands in Wisconsin." *Nematologica*, 13 (1), 33–42. [French summary p. 41.]

Numbers of plant nematodes in both unthrifty and healthy *Pinus* spp. plantations were counted. *Xiphinema americanum* was most common and *Trichodorus californicus* moderately so. The greater number were found deeper in the soil than 6 cm. where pine roots were most abundant. Neither these field observations nor inoculation tests were successful in implicating nematodes as major factors in loss of thrift in pine plantations. J.E.P.

34 –LVOVA, K. A., 1967. [Dynamics of the nematodes of pine seedlings (*Pinus silvestris*) in the Gorkiy region.] *Uchen. Zap. gorkov. gos. pedagog. Inst.*, No. 66, (*Gel'mint. Sb.* No. 5), pp. 13–17. [In Russian.]

35 –MAMIYA, Y., 1967. "Descriptive notes on three species of *Trichodorus* (Dorylaimida: Trichodoridae) from forest nurseries in Japan." *Appl. Ent. Zool., Tokyo*, 2 (2), 61–68.

*Trichodorus cedarus* Yokoo, 1964, the most widely distributed species of the genus in forest nurseries in Japan, is fully described with information supplementing the original description. It is distinguished by the relatively long onchiostyle (mean 60μ), by the 3 ventro-median papillae behind the onchiostyle in the male and, in the female, by the characteristic triangular, cutinized vaginal pieces and the pair of ventro-submedian pores just behind the vulva. Females of *T. minor* and *T. porosus* are briefly described with drawings. M.T.F.

36 –RASKI, D. J. & RIFFLE, J. W., 1967. "Two new species and further notes on *Criconemoides* Taylor, 1936 (Criconematidae: Nematoada)." *Proc. helminth. Soc. Wash.*, 34 (2), 212–219.

2 new species of *Criconemoides* from New Mexico, U.S.A., are described and illustrated. *C. dividus* n.sp., from soil around the roots of *Pinus ponderosa* and *Juniperus monosperma* near Los Alamos, is distinguished from *C. caelatus* by the shorter stylet

and fewer body annules. *C. humilis* n.sp., from soil around the roots of *P. ponderosa*, is distinguished from *C. annulatus* by the much shorter stylet. Notes on 10 other species of the same genus are given. M.R.N.S.

37 –RIFFLE, J. W. & KUNTZ, J. E., 1967. "Pathogenicity and host range of *Meloidogyne ovalis*." *Phytopathology*, 57 (2), 104–107.

29 species of herbaceous plants and 19 species of woody plants were inoculated with larvae of *Meloidogyne ovalis* and kept in a glasshouse for 62 to 80 days with a mean soil temperature of 20°C. to determine the host range and study the pathogenicity of the nematode. Of the herbaceous plants, *M. ovalis* infected only tomato, carrot, onion and geranium and reproduced on none of these. *M. ovalis* infected 12 of the woody plants but reproduced only on *Acer negundo, A. platanoides, A. rubrum, A. saccharum, Betula alleghaniensis, B. papyrifera* and *Ulmus americana. M. ovalis* produced galls on the roots of *A. saccharum* and, typically, giant cells within the galls. *M. ovalis*, infected *U. americana* best at 16°C. and developed best at 20°C. D.W.L.

38 –RUEHLE, J. L., 1967. "Sting nematode damage to sycamore seedlings." [Abstract.] *Nematologica*, 13 (1), 151.

39 -RUEHLE, J. L., 1967. "Distribution of plant-parasitic nematodes associated with forest trees of the world." *Asheville, N.C.: Southeastern Forest Experiment Station and U.S. Department of Agriculture Forest Service*, 156 pp.

40 –SIDDIQI, M. R. & HUSAIN, Z., 1967. "Studies on the genus *Alaimus* de Man, 1880, with description of six new species from India." *Proc. helminth. Soc. Wash.*, 34 (2), 158–167.

6 new species of nematodes from India are described and illustrated. *Alaimus jaulasali* n.sp., from soil around roots of *Shorea robusta* in Jaulasal Forest Range, Uttar Pradesh, is differentiated from *A. primitivus* and *A. parvus* in having a more slender body, in the position of the excretory pore, the shape of the oesophagus and of the tail; the male has a greater number of supplementary papillae than that of *A. primitivus*; it also differs from *A. parvus* in the oesophagus-vulva distance being 30 to 45 μ longer than neck length and the length of tail is over 10 times the anal body-width. *A. thrixus* n.sp., from soil around roots of banana plants at Vishakhapatnam, Andhra Pradesh, differs from *A. parvus* in the more slender body, shape of head and longer tail which measures over 10 times the anal body-width; from *A. meyli* in the conical-narrow lip region, oesophagus-vulva distance equal to or longer than tail length and a shorter tail. *A. hamulus* n.sp., from soil around roots of *Pinus excelsa* at Simla, Punjab, is differentiated from *A. glissus* in details of the amphid, oesophagus, vulva and ventrally hooked tail, and from *A. similis* in details of the oesophagus and vulva and in having an abruptly pointed tail terminus and in being bisexual. *A. leptus* n.sp., from the same locality as *A. hamulus*, is closest to *A. parvus* and *A. thrixus* but differs from both in having an offset, broadly truncated lip region and more cylindroid tail showing slight tapering; it has a wider head and smaller oesophageal enlargement than *A. thrixus*. *A. editorus* n.sp., from soil around roots of *Mangifera indica* at Bahraich, eastern Uttar Pradesh, differs from *A. minor* in having a shorter and narrower oesophagus and a longer tail, from *A. acutus* in the shorter body, position of vulva and shape of tail and from *A. striatus* in the absence of longitudinal striae and in the shape of the tail. *A. medius* n.sp., from soil around roots of *Pinus longifolia* at Simla, Punjab, is mainly differentiated from *A. glissus, A. arcuatus* and *A. parvus* in having a longer neck. A revised key to the genus *Alaimus* is given. M.R.N.S.

41 -SUTHERLAND, J. R., 1967. "Parasitism of *Tylenchus emarginatus* on conifer seedling roots and some observations on the biology of the nematode." *Nematologica*, 13 (2), 191–196. [French summary p. 196.]

*Tylenchus emarginatus* fed and reproduced as a migratory ectoparasite on the roots of 7 species of conifer seedlings with a preference for *Picea* species. It neither fed nor reproduced on 10 species of fungi from soil. Feeding behaviour of *T. emarginatus* on cells of *P. rubens* and *P. mariana* roots is described. *T. emarginatus* can probably cause more than 500 wounds on a root in 24 hours, predisposing the host to infection with damping-off fungi. *T. emarginatus* was propagated on roots of *P. mariana* grown asceptically on agar. D.W.L.

42 –SUTHERLAND, J. R., 1967. "Host range and reproduction of the nematodes *Paratylenchus projectus, Pratylenchus penetrans*, and *Tylenchus emarginatus* on some forest nursery seedlings." *Pl. Dis. Reptr*, 51 (2), 91–93.

The host range and reproduction of *Paratylenchus projectus, Pratylenchus penetrans* and *Tylenchus emarginatus* were determined using 12 species of forest nursery seedlings. All 3 nematodes reproduce better on *Picea* spp. than on *Pinus* spp. Other good to excellent hosts for the nematodes were *Larix laricina* and *Thuja occidentalis. Caragana arborescens* and *Ulmus pumila* were poor hosts or non-hosts for the 3 nematodes. The results of this study suggest that pines are either poor or non-hosts for nematodes of the genus *Pratylenchus*. Mycorrhizae are discussed in relation to their possible influence on the parasitism of seedling roots by nematodes. [A.S.] J.E.P.

43 –SUTHERLAND, J. R., 1967. "Failure of the nematode *Aphelenchus avenae* to parasitize conifer seedling roots." *Pl. Dis. Reptr*, 51 (5), 367–369.

Experiments made under non-aseptic and aseptic conditions showed that *Aphelenchus avenae* does not parasitize the roots of 7 species of conifer seedling. When seedlings were added to non-sterile nursery soil, the populations of *A. avenae* were maintained at a significantly higher level than when the seedlings were absent. It is not thought that the seedlings served as hosts for the nematode. A technique is described for aseptically separating *A. avenae* from non-sporulating fungus hosts. [A.S.] J.E.P.

44 –YOKOO, T., 1967. [Soil nematological notes I.] *Agric. Bull. Saga Univ.*, No. 24, pp. 73–82. [In Japanese: English summary p. 73.]

Notes are given on: the nematodes associated with asparagus, yellow patch of turf, orange nursery soil and fig; the population dynamics of *Tylenchulus semipenetrans* associated with orange trees and *Hirschmanniella oryzae* associated with rice; the effect of nematicides on nematodes associated with *Lilium longiflorum; Pratylenchus penetrans* associated with *Abies sachlinensis*. J.B.

## 1968

45 –ALLEN, M. W. & NOFFSINGER, E. M., 1968. "Revision of the genus *Anaplectus* (Nematoda: Plectidae)." *Proc. helminth. Soc. Wash.*, 35 (1), 77–91.

*Anaplectus granulosus* and *A. magnus* are redescribed and an emended description of *A. submersus* is given. *A. similis* n.sp. from soil around roots of maple in Wasau, Wisconsin, U.S.A., *A. porosus* n.sp. from soil around roots of *Pinus* sp. in Tangmarg, Kashmir, India, and *A. varicaudatus* n.sp. from soil around roots of *Zoysia* grass in Monticello, Florida, U.S.A., are described. *A. porosus* can be distinguished by the presence of an anterior series of dorsal and ventral hypodermal pores. *A. varicaudatus* differs from other species in lacking a cuticularized spinneret. The amphidial openings are more anterior than in other species and the first tuboid supplement is less than half the length of the spicules. The generic diagnosis of *Anaplectus* is emended to include new information on the excretory system, lip region and amphids. *A. arenicola* and *Marinoplectus papillatus* are synonymized with *A. granulosus*. A key to males of *Anaplectus* species is given. [A.S.] S.W.A.

46 –ANDRÁSSY, I., 1968. "Fauna paraguayensis. 2. Nematoden aus den Galeriewäldern des Acaray-Flusses." *Opusc. zool., Bpest*, 8 (2), 167–315. [English summary pp. 311–312.]

In this article, the author gives an account of his investigations on the nematode material collected from 1965 to 1966 in the riverside rain forests of the River Acaray in south-eastern Paraguay. After the description of the collecting areas and localities, a list of species found in 16 samples is given. This is followed by a list of the nematode species so far found in Paraguay. The following are described: *Cephalobus pinguimucronatus* n.sp., *Heterocephalobus loofi* n.sp., *Teratolobus regulus* n.g., n.sp., *Panagrocephalus baloghi* n.sp., *Acrobeles mariannae* n.sp., *Teratocephalus dadayi* n.sp., *Bunonema striatum* n.sp., *Malenchus acarayensis* n.g., n.sp., *Peltamigratus sheri* n.sp., *Nothocriconema paraguayense* n.sp., *Criconema duodevigintilineatum* n.sp., *Aphelenchoides silvester* n.sp., *Aphanolaimus solitudinis* n.sp., *Bastiania acarayensis* n.sp., *Cylindrolaimus bambus* n.sp., *C. procerus* n.sp., *Monhystera tripyloides* n.sp., *Monhystrella hastata* n.sp., *Tobrilia longicaudata* n.sp., *Mesodorylaimus tholocercus* n.sp., *M. guarani* n.sp., *Pungentus mahunkai* n.sp., *Actinca memorabilis* n.sp., *A. dicastrii* n.sp., *Stomachoglossa pachyderma* n.g., n.sp., *Dorylaimellus heynsi* n.sp., *D. cataracticus* n.sp., *Aulolaimoides altherri* n.sp., *Alaimus aculeatus* n.sp. and *Amphidelus boa* n.sp. Actincinae n.subf. is established for *Actinca* and *Stomachoglossa*. *Ironus* is revised and a conspectus given of *Aphanolaimus*, *Bastiania*, *Cylindrolaimus*, *Monhystrella*, *Monochromadora*, *Achromadora*, *Thornia* and *Actinca*, with a key to their species. *Malenchus machadoi* n.comb., *Paraphanolaimus anisitsi* n.comb., *P. microstomus* n.comb., *Monhystrella lepidura* n.comb., *M. paramacrura* n.comb., and *Stomachoglossa costata* n.comb. are erected, *Mesodorylaimus thorneswangeri* nom.nov. is proposed for *Dorylaimus biroi*. The synonomy of a number of species is also considered. [A.S.] J.E.P.

47 –BASSUS, W., 1968. "Über Wirkungen von Industrieexhalaten auf den Nematodenbesatz im Boden von Kiefernwäldern." *Pedobiologia*, 8 (3), 289–295. [English summary p. 289.]

In a pine forest affected by industrial air pollution in East Germany the nematode fauna was seen to be altered. The density of the tree stands decreased, microbial activity in the upper layers of the soil and *p*H of the latter increased, and more saprophagous and predatory nematodes were found. J.B.

48 –BROWNE, F. G., 1968. "Pests and diseases of forest plantation trees. An annotated list of the principal species occurring in the British Commonwealth." *Oxford: Clarendon Press*, xi + 1330 pp.

49 –DASGUPTA, D. R., RASKI, D. J., & SHER, S. A., 1968. "A revision of the genus *Rotylenchulus* Linford and Oliveira, 1940 (Nematoda: Tylenchidae)." *Proc. helminth. Soc. Wash.*, 35 (2), 169–192.

The genus *Rotylenchulus* is reviewed and the generic diagnosis emended. The morphology of *Rotylenchulus* and key to the species is given. *R. nicotiana* and *R. stakmani* are synonymized with *R. reniformis*. Description of the neotype and redescriptions of various stages are given for the genotype, *R. reniformis*. Males and mature females of *R. parvus* and larvae of *R. borealis* are described for the first time. Thus *Rotylenchulus* has 6 new species. *R. macrosomus* n.sp. from *Olea europaea*, *Arachis hypogaea*, *Phaseolus vulgaris* and banana in Israel, is similar to *R. borealis* but differs in its longer stylet, longer hyaline portion to the immature female tail and the larger size of males and immature females. *R. clavicaudatus* n.sp. associated with *Strelitzia* sp. from the Transkei, South Africa, can be distinguished from *R. macrosomus* and *R. borealis* by the lack of annulation on the lip region and the lower 'o' value, and from *R. macrosomus* by the more anterior position of the vulva. *R. leptus* n.sp. from soil around the roots of grasses and *Bamboos vulgaris* from Gwelo, Rhodesia, resembles *R. parvus* but has no annulations in the lip region, and has a larger hyaline portion to the immature female tail and a high conoid lip region. *R. variabilis* n.sp. associated with *Rumex* sp. in Rhodesia and with bean, corn, banana, cowpea, oil-palm and other plants in Kenya and Nigeria, differs from *Rotylenchulus parvus* in the annulation of the lip region and the longer hyaline tail portion. *R. anamictus* n.sp. associated with *Acacia* sp. at Merca, Somalia, differs from *R. parvus* in the more posterior vulva and in the shape and larger size of the tail in the immature female. The body is shorter and the stylet smaller than in *R. reniformis*. *R. macrodoratus* n.sp. from *Vitis* sp., *Laurus nobilis*, and *Prunus amygdalus* soils in Italy, is unique in that its stylet is more than 22 μ long and the stylet knobs have anchor shaped processes directed forwards. P.S.G.

50 –EGUNJOBI, O. A., 1968. "Three new species of nematodes from New Zealand." *N.Z. Jl Sci.*, 11 (3), 488–497.

*Radopholus cavenessi* n.sp. from forest loam in Marton, New Zealand, is close to *R. neosimilis* but differs in having the excretory pore and hemizonid at the level of the nerve ring, in a longer spear (21 μ) in the female and in the spear carrying basal knobs in the male. *Boleodorus spiralis* n.sp. from forest loam in Lower Hutt, New Zealand, has a spiral body 0·40 to 0·49 mm. long, truncate head, 4 distinct incisures, a spear 10 to 12 μ long, vulva at 62·4 to 73·2%, a short ovary with oocytes in double rows and posterior uterine branch one-third of body width. *Tylenchus* (*Lelenchus*) *clarki* n.sp. from forest litter in Lower Hutt, New Zealand, has a body 0·31 to 0·41 mm. long, 2 incisures in lateral fields, a spear 6 to 8 μ long, small club-shaped basal bulb, vulva at 67 to 79% and no post-uterine branch. M.R.S.

51 —FIES, M., 1968. "*Criconema aquitanense* n.sp. (Nematoda: Criconematidae)." *Nematologica*, 14 (1), 47–54. [English summary p. 54.]

*Criconema aquitanense* n.sp. was found in soil around the roots of *Pinus maritimus* in south-west France. Its main characters are the peculiar cuticular ornamentations—small scales with swollen tips on the inferior edge of the annules—the number of annules (R = 90), the size of the spear (101 to 120 μ) and position of the vulva (RV = 14 annules). M.M.H.

52 —RIFFLE, J. W., 1968. "Plant-parasitic nematodes in marginal *Pinus ponderosa* stands in central New Mexico." *Pl. Dis. Reptr*, 52 (1), 52–55.

30 plant nematode species representing 14 genera were found associated with marginal *Pinus ponderosa* and its woodland associates *P. edulis*, *Juniperus monosperma*, *J. deppeana* and *J. scopulorum* in central New Mexico, U.S.A. The most widely distributed nematodes were *Aphelenchoides* sp., *Xiphinema americanum* and *Tylenchus exiguus*. *T. exiguus* was found in at least 96% of all samples. The most abundant nematodes were *Helicotylenchus* spp. The plant nematodes as a whole were more numerous around roots of *Juniperus* spp. than of *Pinus* spp. regardless of the condition of the stand. More nematode species were found in non-drought stands than in drought stands. S.W.A.

53 —RÖSSNER, J., 1968. "Wirkung eines pflanzenverträglichen Nematizids auf die Populationsentwicklung wandernder Wurzelnematoden in Forstpflanzgärten." *Z. PflKrankh. PflPath. PflSchutz*, 75 (9), 527–536. [English summary p. 536.]

Fensulfothion was effective in controlling most nematodes in forest tree nurseries but not *Trichodorus* spp. or *Tylenchorhynchus nanus*. J.B.

54 —RUEHLE, J. L., 1968. "Pathogenicity of sting nematode on sycamore." *Pl. Dis. Reptr*, 52 (7), 523–525.

*Belonolaimus longicaudatus* is reported as being pathogenic on *Platanus occidentalis* under glasshouse conditions in the U.S.A. No top symptoms were observed other than reduced growth, but the roots became fibrous and necrotic. J.B.

55 —RUEHLE, J. L., 1968. "Plant-parasitic nematodes associated with southern hardwood and coniferous forest trees." *Pl. Dis. Reptr*, 52 (11), 837–839.

A geographical tabulation is presented to show new plant-parasitic nematode associations with southern forest hardwoods and conifers other than pines. [A.S.] J.B.

## 1969

56 —BASSUS, W., 1969. "Über die Bekämpfung von Wurzelnematoden in Forstbaumschulen." *Arch. PflSchutz*, 5 (6), 431–444. [English & Russian summaries pp. 442–443.]

Steam treatment, methyl bromide, D-D and Dazomet were evaluated against nematodes (principally *Pratylenchus penetrans* and *Trichodorus* sp.) which cause considerable damage to forest nurseries in East Germany. Only methyl bromide and Dazomet gave satisfactory results; there were some differences depending on the time of application and environmental conditions. The treatment was effective for 2 growing seasons, but the nematodes began to recolonize the beds in the first season. Growth of seedlings was stimulated by methyl bromide fumigation. Dazomet showed some economic advantage, but the longer waiting period before new sowing must be taken into account. M.R.N.S.

57 —BLOOMBERG, W. J. & ORCHARD, W. R., 1969. "Chemical control of root disease of Douglas-fir seedlings in relation to fungus and nematode populations." *Ann. appl. Biol.*, 64 (2), 239–244.

Fumigation of Douglas fir plots with methyl bromide and D-D reduced the incidence of *Xiphinema*, *Pratylenchus* and *Paratylenchus* when present alone and when present in association with *Fusarium*. J.B.

58 —DASGUPTA, D. R., RASKI, D. J. & VAN GUNDY, S. D., 1969. "Revision of the genus *Hemicriconemoides* Chitwood & Birchfield, 1957 (Nematoda: Criconematidae)." *J. Nematol.*, 1 (2) 126–145.

5 new species of *Hemicriconemoides* are reported: *H. parvus* from *Ceanothus* sp. in the USA, *H. intermedius* from baobab in Rhodesia, *H. insignis* from forest soil in Australia, *H. microdoratus* from forest soil in Ceylon and *H. brevicaudatus* from bush soil in Nigeria. *H. squamosus* is proposed as a *species inquirenda*; *H. mangiferae* is judged a valid species. *H. litchi* and *H. birchfieldi* are synonymized with *H. mangiferae* and *H. ureshinoensis* with *H. kanayaensis*. *H. strictathecatus* is considered a valid species. A key to the species of the genus is given. The limitation of use of male diagnostic characters in a mixture of populations of *Hemicriconemoides* with some other criconematids is discussed. The life cycle of *H. chitwoodi* has 4 complete moults. J.B.

59 —FULTON, J. P., 1969. "Transmission of tobacco ringspot virus to the roots of a conifer by a nematode." *Phytopathology*, 59 (2), 236.

*Xiphinema americanum* was found to transmit tobacco ring spot virus to Arizona cypress but not to *Pinus sylvestris* or *P. echinata* in pot tests in the U.S.A. J.B.

60 —GUBINA, V. G., 1969. [Population dynamics of nematodes in roots and rhizospheres of conifer seedlings.] *Parazitologiya*, 3 (4), 378–384. [In Russian: English summary p. 384.]

Observations under natural conditions have shown that the number of nematodes in the roots and rhizospheres of seedlings of *Picea excelsa*, *Pinus silvestris* and *Larix sibirica* increases with the age of the host plants. The maximum number of nematodes was observed in summer in the roots, and in autumn in the soil. Graphs showing the variation of the nematode population in roots and in soil during the year are given. J.A.D.

61 —GUBINA, V. G., 1969. [Seasonal variations in the number of nematodes of the root system and rhizosphere' of *Picea excelsa* seedlings.] *Trudy gel'mint. Lab.*, 20, 55–61. [In Russian.]

62 —HIJINK, M. J., 1969. "Groeivermindering van fijnspar veroorzaakt door *Rotylenchus robustus*." *Meded. Rijksfac. LandbWet. Gent*, 34 (3), 539–549. [English summary p. 549.]

The growth of one-year-old *Picea abies* seedlings was correlated with the prevalence of *Rotylenchus robustus* and *Pratylenchus penetrans* in the soil. Plant size was found to be inversely proportional to preplant density of *R. robustus* but *P. penetrans* appeared to have less effect. Laboratory tests on seedlings yielded similar results. As densities of about 400 nematodes per 100 ml. of soil have an adverse effect on the growth of spruce, *R. robustus*, which reaches

densities of 2,000 per 100 ml. in sandy soils, should be considered of importance. [From English summary.] K.J.O.W.

63 -LVOVA, K. A., 1969. [Nematode fauna of *Larix sibirica* in the Gorkov region.] *Uchen. Zap. gorkov. gos. pedagog. Inst.*, No. 99, pp. 34–39. [In Russian.]

64 —RIFFLE, J. W., 1969. "Effect of nematodes on root-inhabiting fungi." [Proceedings of the 1st North American Conference on Mycorrhizae, April, 1969.] *Miscellaneous Publication, US Department of Agriculture, Forest Service*, No. 1189, pp. 97–113. [En].

The literature on the effect of mycophagous nematodes on non-mycorrhizal root fungi is reviewed and a list of 73 associations of nematodes and fungi given. Difficulty in establishing conifers could be due to nematode feeding on the root mycorrhizae. *Criconemoides rusticum, Hoplolaimus tylenchiformis, Heterodera* sp., *Meloidgyne javanica, Meloidodera floridensis* and undescribed *Meloidgyne* sp. and *Meloidodera* sp. parasitize mycorrhizal short roots of conifers. *Aphelenchoides cibolensis* in laboratory tests killed the fungus *Armillaria mellea* and increased around *Leptographium* sp. without reducing growth. Results of feeding of *A. cibolensis* on 53 other fungi are given. G.O.

65 -RÖSSNER, J., 1969. "Populationsentwicklung pflanzenparasitärer Nematoden unter Koniferen." *Mitt. biol. BundAnst. Ld- u. Forstw.*, No. 136, pp. 50–58. [English summary pp. 57–58.]

Further results are given of population development of plant-parasitic nematodes under conifers in West Germany. The acceleration in the population build-up of *Pratylenchus penetrans* under *Larix* and *Pseudotsuga* as compared with *Pinus* and *Picea* persisted. *Pinus* and *Picea* continued to be more suitable host plants for *Rotylenchus robustus* than *Larix* and *Pseudotsuga*. *Trichodorus aequalis* and *T. pachydermus* did not show such a clear tendency as in the previous year to become established under *Picea* as compared with the 3 other conifers. In July the population was at its peak under all 4 conifers but in September and October a sudden, unexplained, break-down of the population occurred. The population of *R. robustus* showed a general decline in 1967 as compared with 1966. The number of *Pratylenchus penetrans* was remarkably small in September and October of 1967. There was a significant increase in the number of larvae of *R. robustus* from December 1966 to March 1967 under *Picea*. The proportion of adults to larvae of this species was less during summer than during autumn and early spring under *Pinus* but under *Picea* it increased after April. During the year as a whole, the proportion of adults to larvae was less under *Pinus* and *Picea* than under the less suitable hosts *Larix* and *Pseudotsuga* where the numbers of adults and larvae were nearly equal. [From English summary.] M.T.F.

66 -RÖSSNER, J., 1969. "Phytoparasitäre Nematoden in Forstpflanzgärten." *Z. angew. Zool.*, **56** (1), 1–64. [English summary pp. 59–60.]

The commonest genera of plant-parasitic nematodes found, often in large numbers, in forest tree nurseries in Hesse, West Germany, were *Rotylenchus* (and *Helicotylenchus*), *Paratylenchus, Pratylenchus* and *Tylenchorhynchus*. *Trichodorus* spp. were found in nearly all sandy soils but rarely in soils with more clay. *Rotylenchus fallorobustus* inhabits heavier soils where *R. robustus* was rarely found. Populations of *R. robustus* and *Tylenchorhynchus* spp. in sandy soils were reduced in dry periods. Initially equal populations of several genera were influenced in different ways by 4 different conifers, e.g., *Pratylenchus penetrans* increased on *Larix* and *Pseudotsuga* but *Pinus* and *Picea* were poor hosts, *Rotylenchus robustus* developed large populations on *Pinus* and *Picea* but not on *Larix* and *Pseudotsuga*, and large numbers of *Trichodorus* spp. were found on *Picea*. *Tylenchus* sp. and *Aphelenchus avenae* populations also developed differently on different conifer host plants. Populations of *Pratylenchus penetrans* increased under *Helianthus annuus, Solanum tuberosum, Pisum sativum* and *Phaseolus vulgaris*, and *Rotylenchus robustus* increased under the last 2, but populations of both nematodes remained small under adjacent conifers. 2 species of *Trichodorus* increased more under *Pseudotsuga taxifolia* than under the 2 legumes. There was no significant reduction in numbers of plant-parasitic nematodes under fallow soil with weeds. In pot tests, *Rotylenchus robustus* and *R. fallorobustus* multiplied to different degrees on *Picea, Pinus* and *Pseudotsuga*; *R. fallorobustus* survived better in fallow soil. Damage to young conifers is described which seems to be caused directly or indirectly by nematodes. [From English summary.] M.T.F.

67 —RUEHLE, J. L., 1969. "Nematodes parasitic on forest trees. II. Reproduction of endoparasites on pines." *Nematologica*, **15** (1), 76–80. [Germany summary p. 80.]

9 *Pinus* spp. were tested as hosts of 8 species of endoparasitic nematodes in the southern U.S.A. Most of the *Pinus* spp. were hosts of *Hoplolaimus galeatus, Meloidodera floridensis* and *Pratylenchus brachyurus* but none were hosts of *Meloidogyne arenaria, M. hapla, M. incognita, M. javanica* or *Pratylenchus zeae*. J.B.

68 -RUEHLE, J. L., 1969. "Influence of stubby-root nematode on growth of southern pine seedlings." *Forest Sci.*, **15** (2), 130–134.

*Trichodorus christiei* caused reductions in root and shoot growth of seedlings of *Pinus elliotti elliotti, P. palustris* and *P. taeda* in pot tests in the USA. J.B.

69 -RUEHLE, J. L., 1969. "Forest nematology—a new field of biological research." *J. For.*, **67** (5), 316–320.

70 -RUEHLE, J. L., 1969. "Improving seedling growth in longleaf pine plantations with nematicidal soil fumigants." *J. Nematol.*, **1** (3), 248–253.

Seedlings of *Pinus palustris* responded favourably to preplanting in-row fumigation with D-D but DBCP was phytotoxic. J.B.

71 -RUEHLE, J. L. & MARX, D. H., 1969. "Parasitism of pine mycorrhizae by lance nematodes." [Abstract.] *J. Nematol.*, **1** (4), 303.

72 -RUEHLE, J. L. & MARX, D. H,, 1971. "Parasitism of ectomycorrhizae of pine by lance nematode." *Forest Sci.*, **17** (1), 31–34.

In controlled experiments using *Pinus taeda* and *P. echinata* with and without ectomycorrhizae, *Hoplolaimus galeatus* penetrated the fungal mantle and fed in the cortex of mycorrhizae and of lateral roots supporting mycorrhizae. In seedlings without mycorrhizae they were usually confined to the cortex of lateral roots. No necrosis, hypertrophy or

hyperplasia were found but occasionally a few intensely stained cells occurred in advance of nematode feeding sites. M.T.F.

73 –SUTHERLAND, J. R., 1969. "Feeding of *Xiphinema bakeri*." *Phytopathology*, 59 (12), 1963–1965. [French summary p. 1963.]

*Xiphinema bakeri* fed *in vitro* on roots of Douglas fir, Sitka spruce, white spruce and grand fir, but not on western hemlock. Roots of Douglas fir and Sitka spruce were preferred. When first added to culture, the nematodes fed at random along the roots, but after a week they had migrated to and were feeding on root tips. On Sitka spruce roots, feeding caused darkening, swelling and cessation of growth. Cell walls were punctured by a combination of jabbing and twisting of the onchiostylet. Each muscular contraction of the bulbular portion of the oesophagus projected a globule, presumably food, into the intestine. Periods of oesophageal activity alternated with periods of inactivity. Feeding occurred on each cell in a column progressing inward from the epidermis. All life stages except first-stage larvae fed. Eggs were oviposited and larvae emerged 10 to 14 days later. [A.S.] J.E.P.

74 TOKUSHIGE, Y.; KIYOHARA, T. [*Bursaphelenchus* sp. in the wood of dead pine trees.] *Journal of the Japanese Forestry Society* (1969) 51 (7) 193-195 [Ja] Kyushu Branch, Government Forest Experiment Stn., Kumamoto, Japan.

The distribution of an un-named species of *Bursaphelenchus* in the wood of dead pine trees in Kyushu, Japan, and the numbers found, are given. MTF

75—U.S.A., 1969. "Forestry research highlights, 1968. Annual report of the Rocky Mountain Forest and Range Experiment Station." *Fort Collins, Colo: U.S. Department of Agriculture*, 62 pp. [Plant nematodes pp. 30, 31.]

Various entomophagous nematodes were recovered from necrotic tissue of the bark and phloem of aspens. Efforts to find nematodes in white pine weevils, *Pissodes strobi* and *P. approximatus* were negative. Ponderosa and Austrian pine seedlings damaged by *Pratylenchus penetrans* in nurseries in central Nebraska, USA, were treated with methyl bromide. B.G.

76 –ZAKHIDOV, M. T., 1969. [Nematode fauna of citrus plants and soil around the roots in Uzbekistan.] *Dokl. Akad. Nauk uzbek. SSR*, No. 3, pp. 45–47. [In Russian: Uzbek summary.]

## 1970

77 –GOWEN, S. R., 1970. "Observations on the fecundity and longevity of *Tylenchus emarginatus* on sitka spruce seedlings at different temperatures." *Nematologica*, 16 (2), 267–272. [German summary p. 271.]

*Tylenchus emarginatus* fed and reproduced on sitka spruce seedlings growing in water agar without obviously damaging them. Temperature changes between 15 to 25°C. affected the rate at which eggs were laid and the longevity of the nematodes but not the total number of viable eggs produced. The generation time at 25° was between 5 and 6 days. Indications were that nematodes did not reproduce at 30° or at temperatures below 10°C. and eggs failed to hatch after incubation at these temperatures. *T. emarginatus* can rarely reproduce in the field between November and April and probably overwinters in juvenile and adult stages. [A.S.] J.B.P.

78 -GRISSE, A. T. DE & MAAS, P. W., 1970. "*Macroposthonia longistyleta* n.sp. and *Discocriconemella surinamensis* n.sp. from Surinam (Nematoda: Criconematidae)." *Nematologica*, 16 (1), 123–132. [French summary p. 131.]

*Macroposthonia longistyleta* n.sp. and *Discocriconemella surinamensis* n.sp. are described from soil around roots of forest vegetation at Boboenhol, Surinam. *M. longistyleta* differs from all the other *Macroposthonia* spp. in the possession of a long curved stylet, sigmoid vagina, and strongly projecting submedian lobes. *M. bakeri* and *M. incrassata* have such a stylet but it is not curved, neither is the vagina. *Macroposthonia* spp. with a sigmoid vagina differ completely in their other features. *D. surinamensis* most closely resembles *D. yossifovichi* but has fewer annules and lacks labial plates. It differs from other smooth-annuled *Discocriconemella* spp. in body and stylet length. K.J.O.W.

79 -JACKSON, L. W. R., 1970. "Nematode parasitic on shortleaf pine roots." *Pl. Dis. Reptr*, 54 (6), 465–466.

*Criconemoides* sp. is reported from *Pinus echinata* in USA. J.E.P.

80 KIYOHARA, T. [Distribution of plant parasitic nematodes associated with coniferous seedlings in Kyushu, Japan.] *Bulletin of the Government Forestry Experimental Station, Tokyo* (1970) No. 232, 1-12 [Ja, en, 2 pl. (unpaginated)] Kyushu Branch Stn., Kumomoto, Japan.

An extensive survey of forest nurseries in Kyushu, Japan, showed that *Pratylenchus coffeae* was most common, occurring in 80% of all nurseries and parasitic on all conifer species. *Meloidogyne, Helicotylenchus dihystera, Scutellonema brachyurum* and *Rotylenchus pini* were also common. The frequency and number of all nematodes are listed with their hosts. *Cryptomeria japonica* and *Chamaecyparis obtusa* were good hosts for *P. coffeae* and *Pinus thunbergi* and *P. densiflora* poor hosts. [From English summary]. PSG

81 -MACARA, A. M., 1970. "*Xiphinema amarantum* sp. nov. (Nematoda: Dorylaimidae)." *Revta ibér. Parasit.*, 30 (4), 649–658. [French & Spanish summaries pp. 657–658.]

*Xiphinema amarantum* n.sp. from around the roots of *Betula alba* and other forest trees from Minho, Portugal, is described and figured. A large number of males and females from 22 different populations were examined and are compared with the 7 *Xiphinema* spp. closest to the new species. It most resembles *X. diversicaudatum* and *X. basiri*. From *X. basiri* it differs in the longer body, the more anterior vulva, the greater ratio of the tail length to anal body width, the longer stylet, larger uterine chamber and abundance of males. From *X. diversicaudatum* it differs in the shorter body length, smaller stylet extension, shorter female stylet, lesser anal body width, greater ratio of tail length to anal body width and less offset tail peg. In the new species, the greatest cuticle width in the female on the dorsal side of the tail, expressed as a percentage of anal body width, is 18·3 to 37·6%, mean 28% (18 to 22%, mean 20%, in *X. diversicaudatum*). P.S.G.

82 -PETERSON, G. W., 1970. "Response of ponderosa pine seedlings to soil fumigants." *Pl. Dis. Reptr*, 54 (7), 572–575.

Several soil fumigants were tested in a nursery in central Nebraska, USA, in which *Pinus ponderosa* and *P. nigra* seedlings had become infested with *Pratylenchus penetrans*. Beds fumigated with methyl bromide produced more and larger ponderosa pine seedlings than untreated beds. In areas not infested with nematodes, seedlings were as

large in unfumigated beds as in beds fumigated with methyl bromide, with methyl bromide + chloropicrin, methyl bromide + chloropicrin + propargyl bromide, or with 1,3-dichloropropene + chloropicrin + propargyl bromide. A test with methyl bromide and sulphuric acid, alone and in combination, indicated no advantage in using sulphuric acid for damping-off control on beds previously fumigated with methyl bromide.
[A.S.] D.A.Cz.

83 RIFFLE, J. W., 1970. "Nematodes parasitic on *Pinus ponderosa*." *Pl. Dis. Reptr*, 54 (9), 752–754.

*Hoplolaimus galeatus, Helicotylenchus pumulis, Tylenchorhynchus cylindricus, Xiphinema americanum* and *X. diversicaudatum* reproduced on *Pinus ponderosa* seedlings grown under glasshouse conditions. Populations of these species increased well above the original inoculum level. *Criconemoides humilis* and *Tylenchus exiguus* failed to maintain populations on the seedlings. All populations declined in the absence of seedlings. None of the species significantly reduced growth. K.J.O.W.

84 ŠALY, A. [Nematode fauna of forest soil of the Zemplínská Šírava area in east Slovakia.] Nematodofauna lesnej pody v oblasti Zemplínskej šíravy na východnom Slovensku. *Zborník Slovenského Národného Muzea* (1970) 16 (2) 27-32 [Cs, de]

In soil samples taken from roots of *Quercus cerris, Carpinus betulus* and *Pinus silvestris* in the Medvedej area at Zemplínská Šírava, 42 nematode species were found. 88-104 nematodes/100g were found in the surface (1 to 5 cm) layer of forest soil. Of the identified nematode species 12 were new for the area and of these *Aglenchus thornei, Wilsonema auriculatum, W. otophorum, W. tentaculatum* and *Iotonchus zschokkei* are new to Slovakia. †. LV

85 ŠALY, A. [Nematofauna of the soil of a forest ecosystem at Báb.] Nematofauna pódy lesného ekosytému v Bábe pri Nitre. In *Project Báb, Progress Report I, Bratislava.* Bratislava, Czechoslovakia. (1970) 143-148 [Cs, en]

Material for this work was obtained by examination of 80 soil samples taken from the roots of 5 of the commonest plants of the Báb forest ecosystem. 72 species belonging to 35 genera and 13 families were found. *Protorhabditis ruehmi, Panagrolaimus dendroctoni, Panagrobelus coronatus, Chiloplacus demani, C. soosi, Cervidellus desidiosus, Teratocephalus tenuis, Ditylenchus destructor, Neotylenchus abulbosus, N. dendrophilus, Criconemoides stygia, Paratylenchus macrophallus, Dorylaimus minimus, D. rhopalocercus, D. silvestris, D. minutus, D. laticollis, D. parvus, D. brigdammensis* and *Nygolaimus brachyuris* are new for Slovakia.†. LV

86 –SUTHERLAND, J. R. & DUNN, T. G., 1970. "Nematodes in coastal British Columbia forest nurseries and association of *Xiphinema bakeri* with a root disease of Douglas-fir seedlings." *Pl. Dis. Reptr*, 54 (2), 165–168.

The most prevalent plant nematodes found in 3 coastal forest nurseries in British Columbia, Canada, were: *Tylenchus emerginatus, Paratylenchus projectus, Pratylenchus crenatus, Xiphinema bakeri* and *X. americanum*. They were mainly associated with Douglas-fir and Sitka and white spruces. Significantly larger populations of *X. bakeri* were present in areas where a serious root disease (corky root) of Douglas-fir occurred. [A.S.] J.E.P.

## 1971

87 -BLOOMBERG, W. J.; SUTHERLAND, J. R., 1971. "Phenology and fungus-nematode relations of corky root disease of Douglas-fir." *Annals of Applied Biology*, 69 (3), 265–276. [En] Canadian Forestry Service, Dept. of the Environment, Victoria, British Columbia, Canada.

The corky root disease of *Pseudotsuga menziesii* seedlings in forest nurseries in British Columbia, Canada, was investigated and is described in detail. Fungi associated with diseased roots in the field were not shown to be the causal agents in experi-

ments. Strong, though circumstantial, evidence was obtained that the nematode *Xiphinema bakeri* is the primary cause of corky root, e.g.: the lateral distribution of the nematode and the areas of diseased seedlings in nursery beds coincided; nematode populations built up around seedlings from 2 to 4 months after germination while few fungi were isolated from diseased plants under 4 months old; and nematode populations were correlated with root symptoms, and the gross morphology of corky roots resembled that caused by *Xiphinema* in other plants. M.T.F.

88 –CHURCHILL, Jr., R. C. & RUEHLE, J. L., 1971. "Occurrence, parasitism, and pathogenicity of nematodes associated with sycamore (*Platanus occidentalis* L.)." *J. Nematol.*, 3 (2), 189–196.

In a survey of 10 *Platanus occidentalis* plantations in Georgia, USA, 10 species of stylet-bearing nematodes were found. The commonest nematodes were *Helicotylenchus pseudorobustus*, *Xiphinema americanum* and *Criconemoides* sp.; *Hoplolaimus galeatus*, *H. stephanus*, *Trichodorus* sp., *Psilenchus* sp. and *Hemicycliophora* sp. were in less than half the stands. All but *Hoplolaimus galeatus* and *X. americanum* are new host records. In pot tests with *Platanus occidentalis* seedlings or rooted cuttings, *H. galeatus*, *Scutellonema brachyurum*, *Helicotylenchus dihystera* and *H. pseudorobustus* increased 4, 11, 70 and 350-fold in 9 months. The first 2 were semi-endoparasitic, the last 2 were either semi- or completely endoparasitic. *Hoplolaimus galeatus* was pathogenic but *Helicotylenchus dihystera*, *H. pseudorobustus* and *S. brachyurum* had little or no measurable effect on top or root weights. *Trichodorus christiei*, *Xiphinema americanum*, *Meloidogyne hapla*, *M. arenaria* and *M. incognita* did not increase on *P. occidentalis* in the experiments. M.T.F.

89 –CLEMONS, G. P. & KRUSBERG, L. R., 1971. "Root-knot nematode found on London plane trees." *Pl. Dis. Reptr*, 55 (3), 280.

An unnamed new species of *Meloidogyne* was found in galled roots of plane trees (*Platanus* × *acerifolia*) in Washington, D.C., USA. *Tylenchorhynchus* sp., *Pratylenchus* sp., *Xiphinema* sp., *Helicotylenchus* sp., *Hoplolaimus* sp., *Criconemoides* sp., *Trichodorus* sp. and *Hemicycliophora* were also present in the soil round the roots. K.J.O.W.

90 –COLBRAN, R. C., 1971. "Studies of plant and soil nematodes. 15. Eleven new species of *Radopholus* Thorne and a new species of *Radopholoides* de Guiran (Nematoda: Tylenchoidea) from Australia." *Qd J. agric. anim. Sci.*, 27 (4), 437–460.

The following new species have been described from Queensland and New South Wales, Australia: *Radopholus rectus* from *Imperata cylindrica* var. *major*; *R. crenatus* from eucalypt forest soil; *R. intermedius* from soil around roots of *Casuarina torulosa* and *Themeda australis; R. brevicaudatus* from soil around roots of *Cenchrus ciliaris; R. serratus* from virgin forest soil and *Xanthorrhoea* sp. soil; *R. ferax* from roots of *Gerbera jamesoni*; *R. megadorus* from soil in native scrub, around roots of *Ficus opposita* and *Dianella caerula; R. inanis*, *R. clarus* and *R. capitatus* from soil; *R. vacuus* from virgin forest soil; *Radopholoides laevis* from soil around roots of *Livistona* sp., *Casuarina torulosa* and *Themeda australis*. Males are not known for *Radopholus intermedius*, *R. brevicaudatus*, *R. capitatus* and *Radopholoides laevis*. Separate keys are given for male and female. M.R.S.

91 –GOWEN, S. R., 1971. "*Tylenchus emarginatus* and *Tylenchorhynchus dubius* associated with Sitka spruce (*Picea sitchensis*) seedlings." *Pl. Path.*, 20 (2), 69–72.

Experiments in tubes showed that Sitka spruce (*Picea sitchensis*) was a good host for *Tylenchus emarginatus* and *Tylenchorhynchus dubius* and that these nematodes were able to stunt root growth. Both species were more abundant in plots at Woburn, Bedfordshire, England, where Sitka spruce was grown repeatedly than in nearby land under other crops. In 1968 nematodes were more numerous in plots with nitrogen fertilizer than in those without. In 1969 they were fewer, possibly because populations remaining from 1968 were too great for the seedlings to support and/or because rainfall was much less. [A.S.] M.T.F.

92 GUBINA, V. G. [Effect of plant nematodes on dry matter content of Norway spruce seedlings.] *Trudy Gel'mintologicheskoĭ Laboratorii (Voprosy Biologii, Fiziologii i Biokhimii Gel'mintov Zhivotnykh i Rastenii)* (1971) **21**, 176-178 [Ru]

Although visible inhibition of growth in conifers (including Norway spruce, *Picea abies*) has been attributed to nematodes in the past, the author has hitherto been unable to demonstrate this relationship. In further tests in the USSR, 2.5-month-old spruce seedlings, grown under sterile conditions, were artificially infected, at approximately normal density, with a water suspension of 23 species of phytonematodes (listed) taken from roots and soil of spruce seedling plots. The predominant species were *Aphelenchus avenae, Aglenchus agricola, Tylenchus ditissimus, Pseudhalenchus anchilisposomus* and *Paratylenchus nanus*. The dry weight of the plants was determined 12 months later. Although there were no visible signs of growth inhibition and no differences in needle colour by comparison with uninfested seedlings grown under similar conditions, dry weight of underground and upper parts was reduced by an average of 22 and 13%, respectively. MJD

93 GUBINA, V. G. [Vertical distribution and seasonal changes of nematode fauna in the soil of tree nurseries.] *Trudy Gel'mintologicheskoĭ Laboratorii (Voprosy Biologii, Fiziologii i Biokhimii Gel'mintov Zhivotnykh i Rastenii)* (1971) **21**, 172-175 [Ru]

Vertical distribution of nematodes in the soil down to 60 cm around 2-year-old pine trees in spring, summer and autumn of 1967 was studied near Moscow, USSR. The species found are listed according to ecological groups and the results are tabulated. 54 species in 5 orders were found. The maximum number of species and nematodes occurred in autumn, when twice as many nematodes were found as during summer. Maximum numbers of species and individuals were found at 0 to 20 cm in spring and summer and at 0 to 30 cm in autumn. Phytohelminths predominated at all levels and seasons, important ones including *Ditylenchus dipsaci* and species of *Pratylenchus* and *Paratylenchus*. The reduction in numbers in summer is attributed to colonisation of pine roots and a fall in soil humidity to 16%, and the rise in autumn to emergence from roots and a rise in soil humidity to 25%. MJD

94 –GUBINA, V. G., 1971. [Nematodes and mycorrhiza formation in conifer seedlings.] *Itogi Nauki, Ser. Biol., Zoologiya* (*Nematody Rastenii*) 1970, pp. 61–77. [Ru] GELAN, Leninski Prospect 33, Moscow B-71, USSR.

In this review, the nature of the connection between nematodes such as *Aphelenchus*, *Aphelenchoides* and *Tylenchus* and mycorrhiza on conifers, and the parasitic status of these nematodes are discussed. Sutherland's investigations indicated that *Aphelenchus* feeds to varying degrees on several mycorrhiza-forming fungi, the effects evidently slow down the formation of the mycorrhiza, make it more susceptible to attack by pathogens, and somehow disrupt the symbiotic relationship between root and fungus. These nematodes do not enter the roots. Riffle and others have also shown that all 3 genera mentioned feed on mycorrhizal fungi while Gubina's investigations indicated that the trees become suitable for nematode attack at the age of 2 to 3 years, that is when mycorrhizae have become established; unhealthy trees have fewer nematodes and mycorrhizae. Although there appears to be a connection between these nematodes and plant growth, the precise

interactions between mycorrhizae, mycohelminths and non-specific helminths leading to poor growth remain unclear. M.J.D.

95 HEYNS, J., 1971. "Three *Xiphinema* species from the south western Cape Province (Nematoda: Longidoridae)." *Phytophylactica*, 3 (3), 107–114. [En, fr, af] Rand Afrikaans Univ., Johannesburg, South Africa.

*Xiphinema parvistylus* [*?parvistylum*] n.sp., *X. meridianum* n.sp. and *X. index* collected in South Africa are described and figured. Females of *X. parvistylus* from among roots of pine, wattle, Port Jackson trees, apple, peach and citrus are 2·43 to 3·10 mm. long and have a 66 to 80 μ long odontostyle, 49 to 57 μ long spear extension, vulva at 49 to 56%, paired ovaries, small Z-organ with 4 or 5 granular brownish structures and a conoid, pegged tail 1·3 to 1·9 times the anal body diameter long. *X. meridianum* based on females from vineyard, fruit tree and virgin soils resembles *X. coxi* but differs in having a shorter odontostyle (92 to 104 μ long), a more posterior vulva (44 to 54%) and a narrower (11 to 13 μ wide) and more knob-shaped lip region. This species also resembles *X. italiae* but differs in having a larger body (3·09 to 3·82 mm.), a well-developed Z-organ with 4 or 5 large darkish granular bodies and a shorter tail (31 to 50 μ or 1·3 to 1·8 times the anal body diameter long). M.R.S.

96 HIRSCHMANN, H.; TRIANTAPHYLLOU, A. C., 1971. "Development and sex differentiation of *Meloidodera floridensis*." [Abstract.] *J. Nematol.*, 3 (4), 313. [En] Dept. of Plant Pathology, N. Carolina State Univ., Raleigh, NC 27607, USA.

97 JOHNSON, S. R.; FERRIS, J. M., 1971. "Nematode community structure of selected deciduous woodlots." [Abstract.] *J. Nematol.*, 3 (4), 315–316. [En] Dept. of Entomology, Purdue Univ., Lafayette, IN 47907, USA.

98 KIYOHARA, T.; TOKUSHIGE, Y. [Inoculation experiments of a nematode, *Bursaphelenchus* sp., onto pine trees.] *Journal of the Japanese Forestry Society* (1971) 53 (7) 210-218 [Ja, en] Kyushu Branch, Government Forestry Experiment Stn., Kumamto, Japan.

A series of inoculation tests was conducted to determine the effect of *Bursaphelenchus* sp. on pine trees in S.W. Japan. Injections of 600 nematodes caused oleoresin exudation; injections of more than 30,000 nematodes per tree caused death. Inoculum containing a pure suspension of *Bursaphelenchus* sp. or a mixed suspension of *Bursaphelenchus* and spores of the fungus *Pestalotia* killed healthy pine trees but neither the fungus alone nor the filtrate from the nematode/fungus culture was toxic. Inoculation into xylem vessels and into soil round intact roots gave high mortality rates. Monthly inoculation experiments showed highest mortality after the June to August inoculations. After March inoculations death of trees was slower and fewer trees died. *Pinus thunbergii, P. densiflora* and *P. luchuensis* are highly susceptible to *Busaphelenchus: P. taeda, P. strobus, P. pungens* and *P. banksiana* are highly resistant. *Cryptomeria japonica* and *Chamaecyparis obtusa* show no harmful effects after inoculation. [From English summary]. PC

99 L'VOVA, K. A. [Dynamics of the nematode fauna of year-old pine seedlings on sandy loam soil in the Gor'kiĭ region.] *Materialy Nauchnykh Konferentsiĭ Vsesoyuznogo Obshchestva Gel'mintologov, 1968* (1971) No. 22, 146-149 [Ru] Gor'kiy Teaching Inst., USSR.

100 RUEHLE, J. L., 1971. "Reaction of two races of sand pine (*Pinus clausa*) to parasitism by the lance nematode, *Hoplolaimus galeatus*." [Abstract.] *J. Nematol.*, 3 (4), 328–329. [En] Forestry Sciences Laboratory, Southeastern Forest Experiment Stn, Forest Service, USDA, Carlton St., Athens, GA 30601, USA.

[Resistance to *Hoplolaimus galeatus* lacking in both Ocala and Choctawhatchee races of *Pinus clausa*.]

101 -RUEHLE, J. L., 1971. "Nematodes parasitic on forest trees: III. Reproduction on selected hardwoods." *J. Nematol.*, 3 (2), 170–173.

The host-parasitic relationships of 13 species of plant-parasitic nematodes and 5 species of hardwoods native to the southeastern USA were tested on glasshouse-grown tree seedlings for 6–10 months. Criteria for parasitism were completion of life-cycle and population increase of nematodes. *Belonolaimus longicaudatus, Helicotylenchus dihystera, Scutellonema brachyurum* and *Tylenchorhynchus claytoni* parasitized and reproduced on 3 or more of the species tested. *Hoplolaimus galeatus* and *Pratylenchus brachyurus* parasitized 2 species. *Trichodorus christiei* and *Criconemoides xenoplax* parasitized only red maple. *Meloidogyne javanica/Liriodendron tulipifera* combination was the only positive root-knot nematode/hardwood host-parasite relationship. *Hemicycliophora silvestris, Meloidogyne arenaria, M. incognita* and *M. hapla* were not parasites of the tree species tested. The trees tested were *Acer rubrum, Liquidambar styraciflua, Liriodendron tulipifera, Platanus occidentalis* and *Populus heterophylla.* [A.S.] M.T.F.

102 SALT, G. A. Conifer seedling pathology. *Report on Forest Research, London* (1971) 131-132 [En] Rothamsted Experimental Stn., Harpenden, Herts, UK.

Aldicarb raked into the soil surface at 2 g/yd² in March and 4 g/yd² in June killed many free-living and plant-parasitic nematodes but had little effect on growth of seedling Sitka spruce [*Picea sitchensis*]. MTF

103 -SCOTTO LA MASSESE, C., 1971. [Pathogenic nematodes of fruit and forest nurseries.] "Les nématodes nuisibles en pépinières fruitières et forestières." *Pépiniéristes-Horticulteurs-Maraîchers, Special Pépinières,* No. 115, 11 pp. [Fr]

Nematode diseases of fruit trees and forest nurseries are reviewed. Items considered are sources of contamination, mechanisms of infection, pathology and methods of control. Various nematicides are listed with comments on their efficacy. The principal genera and families of nematodes concerned are named and briefly described. A.J.

104 SHŌJI, T. [Distribution of plant parasitic nematodes associated with coniferous seedlings in the national forest nurseries in the Tôhoku district of Japan.] *Bulletin of the Government Forest Experiment Station* (1971) No. 241, 19-29 [Ja, en] Tôhoku Branch Stn., Government Forest Experiment Stn., Morioka, Iwate 020-01, Japan.

A survey of the parasitic nematodes associated with coniferous seedlings was conducted from 1967 to 1969 in the national forest nurseries in the Tôhoku district of Japan. 307 samples from 66 nurseries were processed by a modified Seinhorst elutriator technique and Christie & Perry's method for the soils, and Young's method for separation of migratory nematodes from roots. 6 nematode genera, *Pratylenchus, Trichodorus, Tylenchorhynchus, Paratylenchus, Criconemoides* and *Xiphinema,* were found. *Pratylenchus penetrans* and *Trichodorus cedarus* were commonest and other nematodes showed comparatively low population levels. Fewer *P. penetrans* were counted on *Pinus densiflora* than on *Cryptomeria japonica.* Theere was no clear relationship between the population level of *P. penetrans* and the *p*H or texture of the soil. Successive cultivation of *C. japonica* seedlings increased the populations, but low population levels were observed on seedlings after fallowing.† MI

105 STRIGANOVA, B. R. [Comparative characteristics of the activity of different groups of soil invertebrates in the process of the breakdown of forest litter.] *Ekologiya* (1971) 4, 36-43 [Ru]

A brief section is devoted to nematodes. Unlike other invertebrates the nematodes do not digest cell walls, and thus do not take a direct part in the processes of breakdown of plant remains or of mechanical and chemical breakdown of the litter. Their chief importance lies in the fact that when dead, they form a rich nitrogenous substrate for such processes. MJD

106 –TRIANTAPHYLLOU, A. C., 1971. "Oogenesis and the chromosomes of the cystoid nematode, *Meloidodera floridensis*." *J. Nematol.*, 3 (2), 183–188.

Three *Meloidodera floridensis* populations of different geographic or host origin all reproduced by mitotic parthenogenesis. One of them from pine (*Pinus taeda*) had a somatic chromosome number of 26, whereas another population from pine and one from azalea (*Rhododendron* sp.) had $2n = 27$ chromosomes. All are considered to be triploid forms derived from an amphimictic ancestor with $n = 9$ chromosomes, the basic number in the closely related genus *Heterodera*. Evidence is presented which suggests that during division the chromosomes of the germ-line cells of the developing embryo behave differently from those of all other blastomeres. [A.S.] M.T.F.

107 –UNITED STATES OF AMERICA, 1971. "Forestry research highlights, 1970. Annual report of the Rocky Mountain Forest and Range Experiment Station." *Fort Collins, Colo: U.S. Department of Agriculture*, iv + 51 pp. [Plant nematodes p. 41.]

In tests in New Mexico, USA, the indigenous nematodes *Hoplolaimus galeatus, Helicotylenchus pumilus, Tylenchorhynchus cylindricus, Xiphinema americanum* and *X. diversicaudatum* parasitized *Pinus ponderosa*. Ponderosa pine is not a host for *Criconemoides humilis* or *Tylenchus exiguus*. B.G.

108 –WALLACE, H. R., 1971. "The influence of the density of nematode populations on plants." *Nematologica*, 17 (1), 154–166. [German summary p. 165.]

Pot experiments indicated that top growth in some species of plants was stimulated by low numbers of larvae of *Meloidogyne javanica*. In such plants, root weight increased as numbers of nematodes increased. In a second group of plants, weights of tops were not influenced by nematode density and in a third group of plants, weights of tops decreased linearly with increasing nematode numbers. The differences in the responses of plants to infection by *M. javanica* are considered to be the result of the interaction between inhibitory and stimulatory processes in the plant. Plants in which top growth remains constant up to a particular nematode density (the tolerance level) are considered to be just one example of a series of possible relationships between the stimulatory and inhibitory processes. Studies on the relationship between numbers of *Helicotylenchus dihystera* and the growth of turf and between *Trichodorus porosus* and the growth of pine seedlings are discussed in relation to the usefulness of the concept of tolerance level in field ecology. [A.S.] M.T.F.

109 WASILEWSKA, L., 1971. [Nematodes in a young pine plantation in the Laski Forest Administration District of the Kampinos Forest.] "Nicienie młodnika sosnowego w Nadleśnictwie Laski, Puszcza Kampinoska." *Zesz. probl. Postęp. Nauk roln.*, No. 121, pp. 159–167. [Pl, en, ru] Dział Ekologii Stosowanej Zakładu Ekologii PAN, Warsaw, Poland

Nematode populations found in soil samples from a 15-year-old plantation of *Pinus silvestris* on sandy soil in the Laski Forest district in Poland, were analysed. Saprobionts accounted for 46% of the total, Dorylaimida (classed as omnivorous) 21%, parasites of higher plants 13%, mycophagous species 12% and virus vectors 5%. At least 41 species were found and are listed. The chief plant parasites were *Trichodorus pachydermus* (about 100

per 100 ml. of soil) and *Xiphinema americanum* (25 per 100 ml. of soil). *Tylenchorhynchus dubius* occurred in small numbers while *T. microphasmis* was relatively numerous. [From English summary.] M.T.F.

110 WASILEWSKA, L. Nematodes of the dunes in the Kampinos forest. II. Community structure based on numbers of individuals, state of biomass and respiratory metabolism. *Ekologia Polska* (1971) 19 (38) 651-688 [En, pl] Inst. of Ecology, PAN, Nowy Świat 72, Warsaw, Poland.

Nematodes collected on 6 occasions during a year from samples of sandy soil from 6 stations (4 on afforested dunes representing a series with increasing humus content and age of tree stand, one a mixed forest and one a dry pine forest) in the Kampinos Forest, Poland, were counted and their biomass calculated. They were classified as microbivorous (18 genera) fungivorous (5 genera), parasites of higher plants (21 genera), omnivorous (7 genera), predators (4 genera) or of unknown food habits (4 genera). Estimates were made of the respiratory metabolism of the different groups. The microbivores were most numerous followed by fungivores and plant parasites while the omnivores and microbivores had the greatest biomass. The greatest numbers and biomass were found in spring and autumn and it appeared that most nematodes overwintered as juveniles. In the successive sampling stations, from almost bare dune to afforested dune, there was an increase in numbers, biomass and oxygen consumption in the nematode community as a whole, while the percentage of microbivores increased and omnivores decreased. Numbers increased more rapidly than biomass in all groups. Oxygen consumption by the omnivorous and microbivorous groups was far higher than that of the other groups. The detailed findings are set out in 20 graphs and 8 tables. MTF

111 WU, L. Y., 1971: "*Pratylenchus macrostylus* n.sp. (Pratylenchinae: Nematoda)." *Can. J. Zool.*, 49 (4), 487–489.

*Pratylenchus macrostylus* n.sp. was recovered from soil around the roots of *Betula papyrifera* and *Picea glauca* in Algonquin Park, Ontario and from soil around *Pseudotsuga menziesii* in Vancouver, British Columbia, Canada. It has the longest spear in the genus, usually 22 to 24 μ long, with the spear knob flattened on the anterior surface, the lip region roundly convex, generally with 2 annules. The labial framework is strongly arched and extends into 2 body annules. The tail is usually conically rounded and the post-uterine branch has a vestigial ovary. M.R.N.S.

## 1972

112 ANDRÁSSY, I. [Two new genera of soil nematodes.] Zwei neue Gattungen von Bodennematoden. *Annales Universitatis Scientiarum Budapestinensis de Rolando Eötvös Nominatae, Sectio Biologica* (1972) 14, 187-192 [De] Lehrstuhl für Tiersystematik der Eötvös Loránd Univ., Budapest, Hungary.

*Margaronchulus mulveyi* n.g., n.sp. is described from a single female from virgin forest soil in Congo Brazzaville. It is placed in Mylonchulidae and resembles *Polyonchulus* but differs in having a sharply offset head and only one row of denticles as compared with a less sharply offset head and denticles in 2 longitudinal rows as well as 2 or more transverse rows in *Polyonchulus*. *M. mulveyi* is 0.93 mm. long with a=36, b=4.2, c=4.6 and V=57%. The tail is 12 anal body-widths long and tapers to a narrow rounded tip without a caudal gland. *Minidorylaimus* n.g. is placed in the subfamily Mesodorylaiminae of Dorylaimidae with *Mesodorylaimus*, *Drepanodorylaimus* and *Calodorylaimus* from which it differs in the shape of the oesophagus, the structure of the vulva and in its small size. Males were not found. The type species, *Minidorylaimus decembris* n.sp. was found in virgin forest soil in Congo Brazzaville. It is 0.83 to 0.85 mm. long with thin cuticle, offset head, spear 9-10 μ long, the oesophagus expanding behind the middle and a short pre-rectum. The egg is 3 to 3.7 times longer than the body width. The tail is whip-like, 20 to 23 times as long as the anal body-width. The vulva lips are not cuticularised and have radiating striations. MTF

113 BARHAM, R. O. Effect of nematodes and *Phytophthora cinnamomi* on mycorrhizae of shortleaf pine seedlings. [Abstract.]. *Phytopathology* (1972) 62 (8) 801 [En] Univ. of Georgia, Athens, USA.

In experiments, *Tylenchorhynchus claytoni* and *Helicotylenchus dihystera* penetrated ectomycorrhizae of *Pinus echinata*. *Phytophthora cinnamomi* infected ectomycorrhizae penetrated by *H. dihystera* but not by *T. claytoni*. Nematodes are shown to be able to modify the resistance of ectomycorrhizae to attack by *P. cinnamomi*. MTF

114 CHOI, Y. E.; GERAERT, E., 1972. "Some remarkable Tylenchida from Korea." *Nematologica*, 18 (1), 66–73. [En, fr] Dept. Horticulture, Kyung-Pook National Univ. Taegu, Korea.

Four species of Tylenchida from Korea are discussed. Only one male of *Eutylenchus africanus* was found and it conforms to the original description but the stylet is 18·5 μ long. *Eutylenchus orientalis* Husain and Khan, 1968 is synonymised with *E. africanus*. *Hemicriconemoides varionodus* n.sp. from pine tree soil in Kyung Pook province, Korea, has more or less rounded stylet knobs and is thus related to *H. strictathecatus* but differs from it in the first annule of the lip region being rounded and not directed forward, in having 4 to 7 annules between vulva and anus and 102 to 112 body annules. The new species is close to *H. gaddi* but differs in the shape of the stylet knobs and the longer (84 to 98 μ) stylet. Males of *Merlinius koreanus* with 21·5 to 24·0 μ long stylet, 22 to 27 μ long spicules and a variable bursa structure are described for the first time. One male had a tail like that in females. *Rotylenchus orientalis* found around pine tree roots in Korea is briefly described. It is interesting for its intermediate position between the genera *Rotylenchus* and *Helicotylenchus*. M.R.S.

115 FERRIS, V. R.; FERRIS, J. M. Nematode community dynamics in natural and disturbed environments. [Abstract.]. In *International Symposium of Nematology (11th), European Society of Nematologists, Reading, UK, 3-8 September, 1972. Abstracts.* (1972) 21-22 [En] Dept. of Entomology, Purdue Univ., Lafayette, Indiana 47907, USA.

[Nematode community structure analyzed in soil samples from natural wooded areas, cultivated fields and stream bottoms in north-central USA.].

116 GOTOH, A. [Genera of plant-parasitic nematodes found from forest soil in Kyushu.] *Japanese Journal of Nematology* (1972) 2, 23-24 [Ja, en] Kyushu Agricultural Experiment Station, Nishigoshi-machi, Kumamoto, 861-11, Japan.

A nematode survey was made of forest soil at 8 locations in Kyushu, southwestern Japan. Soil samples were collected from forests of *Pinus densiflora, Quercus acutissima* etc. commonly associated with bamboo grass, and from recently reclaimed fields in the forest. Nematodes were extracted by the Baermann funnel technique. Among plant-parasitic nematodes isolated, *Paratylenchus* was found most frequently, followed by *Helicotylenchus, Trichodorus*, and *Meloidogyne*. *Xiphinema* and *Criconemoides* were also obtained, but no specimen of *Pratylenchus* was detected in this survey. [From English summary.]. RKTW

117 GUBINA, V. G. [Nematode fauna of *Picea excelsa* (Moscow region).] In *Nematody rastenii*. Voronezh, USSR: Tsentral'no-Chernozemnoe Knizhnoe Izdatel'stvo. (1972) pp. 174-184 [Ru]

118 GUBINA, V. G. [Nematode fauna of pine and larch seedlings (Moscow region).] In *Nematody rastenii*. Voronezh, USSR: Tsentral'no-Chernozemnoe Knizhnoe Izdatel'stvo. (1972) pp. 185-190 [Ru]

119 HARRISON, R. E.; MURAD, J. L. Effects of annual prescribed burning on nematode populations from a Louisiana pine forest. [Abstract.]. *Journal of Nematology* (1972) 4 (4) 225-226 [En] Dept. of Zoology, Louisiana Tech. Univ., Ruston 71270, USA.

[Nematodes not named. Significantly greater numbers from the unburned plot.].

120 HEUNGENS, A.; DE GRISSE, A. T. [The influence of nematicides on *Pratylenchus penetrans* and the growth of conifers.] De invloed van nematiciden op *Pratylenchus penetrans* en de groei van coniferen. *B.V.O. Mededelingen* (1972) No. 66, 6 pp. [Nl, en] Bedrijfsvoorlichtingsdienst, Oost-Vlaanderen, Belgium. From *Horticultural Abstracts 42*, 8101.

In 2-year trials of the effects of nematicides on container-grown *Chamaecyparis lawsoniana, Picea abies* and *Cedrus atlantica* and on soil populations of *Pratylenchus penetrans*, the nematodes were best controlled with aldicarb and DuPont 1410, both at 4g/m$^3$. Plant growth was increased by up to 20%. Dazomet at 127.5 g/m$^3$ and D-D at 360 g/m$^3$ also effectively controlled the nematodes. MTF

121 HOOPER, D. J., 1972. "Two new species of *Trichodorus* (Nematoda: Dorylaimida) from England." *Nematologica*, 18 (1), 59–65. [En, de] Rothamsted Experimental Stn., Harpenden, UK.

*Trichodorus velatus* n.sp., is from sandy soils growing Sitka spruce seedlings, arable crops and herbaceous plants. The male resembles *T. similis* but its unstriated spicules are stouter with a wider, noncephalated, proximal end; a narrow characteristically bent central area and a distal region with a distinct subventral flange (velum). The females has smaller refractive thickenings at the vulva than *T. similis* and resembles *T. viruliferus*, but the refractive thickenings are more obvious and the vaginal cervix has more pronounced lobes in lateral view. *T. variopapillatus* n.sp. is from woodland, wet, sandy soil associated with the roots of elder (*Sambucus nigra* L.). Some males have two, others three, ventromedian cervical papillae and the unstriated spicules are of a similar shape to *T. similis* but much thinner. The female has conspicous refractive blocks at the vulva and the vaginal region is rounded. [A.S.] M.R.S.

122 JANSEN, W. [Nematodes of ornamental trees and conifers and their control.] Nematoden der Ziergehölze und Koniferen und ihre Bekämpfung. *Deutsche Baumschule* (1972) No3, 59 [De]

123 JOHNSON, S. R.; FERRIS, V. R.; FERRIS, J. M. Nematode community structure of forest woodlots. I. Relationships based on similarity coefficients of nematode species. *Journal of Nematology* (1972) 4 (3) 175-183 [En] Dept. of Entomology, Purdue Univ., Lafayette, Indiana 47907, USA.

In Indiana, USA, nematode communities were studied in 18 mixed hardwood stands of varying composition, soils, physiography and past management practices. The sites were sampled in April, July and October, in 1968 and 1969. In all, 175 species in 8 orders were found and are listed; 18 species occurred at all sites and about half the species were found at more than 50% of the sites. The taxonomic similarity of nematode populations between the sites, based on species composition, is illustrated in a dendrogram based on a resemblance equation. Sites with similar nematode species composition showed similarities in dominant tree species and soil types. The most dissimilar sites were those that had suffered major disturbances in the past. MTF

124 —KHAN, E.; SAHA, M.; SESHADRI, A. R., 1972. "Plant parasitic nematodes from Kumaon Hills, India. I. Two new species of *Paralongidorus* (Nematoda: Longidoridae)." *Nematologica*, 18 (1), 38–43. [En, fr] Div. of Nematology, Indian Agricultural Research Inst., New Delhi-12, India.

*Paralongidorus boshi* n.sp. from soil about the roots of *Prunus domestica* at Almora, India has 3·6 to 4·8 mm long body, 107 to 118 μ long spear, 48 to 58 μ long spear extension, asymmetrically bilobed amphids with slit-like apertures about 68% of lip region width long, vulva at 46 to 49%, a dorsally convex-conoid female tail 0·68 to 0·77 times anal body width long and 48 μ long spicules. *P. spiralis* n.sp. from soil around the roots of *Pinus longifolia* at Rani Khet, India has 2·5 to 3·9 mm long, strongly curved body, broad pouch-like amphids with slit-like apertures occupying 50 to 60% of lip width, 70 to 93 μ long spear, 39 to 53 μ long spear extension, vulva at 46 to 49% and a dorsally convex, roundly conoid tail 1·0 to 1·2 times anal body width long. A female of *P. spiralis* has 2 vulvae and another female has 2 basal oesophageal bulbs. A single male is known only for *P. boshi* and is described. M.R.S.

125 LANE, C. L.; SHEARIN, A. T. Aldrin affects nematodes and mycorrhizal growth on loblolly pine seedlings. *Forest Science* (1972) 18 (4) 319-320 [En] College of Forest and Recreation Resources, Dept. of Forestry, Clemson Univ., Clemson, S.C.29631, USA.

One or 2 g of 25% granular aldrin were applied around *Pinus taeda* seedlings in pots of sterile soil. 8 months after treatment significant decreases in numbers of nematodes and increases in mycorrhizal growth were found which were associated with increase in aldrin level. Untreated pots contained 477 stylet-bearing and 125 non-stylet-bearing nematodes per 50g of soil, whereas pots with 1g aldrin had 8 and 30 per 50g of soil, respectively, and pots with 2g aldrin had 19 and 24 per 50g of soil, respectively. RTKW

126 MACARA, A. M. Nematodes and associated fungi found in forest nurseries. In *Actas do III Congresso da União Fitopatológica Mediterrânea, Oeiras, 22-28 Outubro 1972.* Portugal. (1972) 321-326 [En, pt] Laboratório de Patologia Florestal, Oeiras, Portugal.

*Xiphinema amarantum, Paralongidorus* and *Eudorylaimus* were found, together with *Fusarium*, in the rhizosphere of forest seedlings from nurseries in the north of Portugal. Empty cysts of *Heterodera rostochiensis* were also detected at one of the nurseries. In seedlings of *Pinus pinaster* inoculated with *X. amarantum* or mechanically damaged at the base of the hypocotyl and at the root crown, the incidence of damping off in the presence of *Fusarium oxysporum* was greatly increased as compared with seedlings inoculated with just *F. oxysporum*. Feeding activity of some nematodes was found to take place on the root, hypocotyl and root crown, wounds being made by puncturing cells with the stylet. It is concluded that *X. amarantum* increases the incidence of damping off by damaging the hypocotyl and root crown, thus facilitating the entry of *Fusarium*. CWG

127 MAMIYA, Y.; ENDA, N. Transmission of *Bursaphelenchus lignicolus* (Nematoda: Aphelenchoididae) by *Monochamus alternatus* (Coleoptera: Cerambycidae). *Nematologica* (1972) 18 (2) 159-162 [En, de] Government Forest Experiment Stn., Meguro, Tokyo, Japan.

*Bursaphelenchus lignicolus* dauerlarvae were found on 4 of 21 species of beetles collected in pine forests in Japan. They occurred most frequently and in greatest numbers on *Monochamus alternatus*, but also on *Acanthocinus griseus, Arhopalus rusticus* and *Corymbia succedanea*. In pine forests severely affected with wilting disease, 75 to 100% of *M. alternatus* carried an average of 15,000 *B. lignicolus* larvae. When contaminated beetles fed on fresh live pine twigs, the xylem became infested with the nematodes within 3 weeks. It is concluded that *M. alternatus* plays an important role in the spread of *B. lignicolus* and the associated wilt disease of pines in Japan. MTF

128 -MAMIYA, Y.; KIYOHARA, T., 1972. "Description of *Bursaphelenchus lignicolus* n.sp. (Nematoda: Aphelenchoididae) from pine wood and histopathology of nematode-infested trees." *Nematologica*, 18 (1), 120–124 + 2 pp. plates. [En, de] Government Forest Experiment Stn., Meguro, Tokyo, Japan.

*Bursaphelenchus lignicolus* n.sp. occurring mostly in axial and radial resin canals of wood of pine trees (*Pinus densiflora* and *P. thunbergii*) in Japan is described. The vulva has a wide, overlapping anterior lip flap similar to that of *Laimaphelenchus* and *Rhadinaphelenchus* but the tail and spicule shape are as in *Bursaphelenchus*. The lip region is high and offset, stylet 14 to 18 μ long with small basal swellings, ovary outstretched with single row of oocytes, postuterine sac extends three-fourths distance to anus, vulva is at 67 to 78%, female tail is subcylindrical with broadly rounded to digitate terminus, male tail is arcuate with talon-like pointed terminus surrounded by terminal alae and the paired, separate spicules have a sharply pointed prominent rostrum and cuticular-like projections on distal ends. The resin canal epithelial cells of infested wood were damaged and sometimes completely destroyed. The destruction of epithelial cells was also observed on 2-year-old red pine seedlings 21 days after inoculation with 3,000 to 5,000 *B. lignicolus*, while 7 to 13 inoculated seedlings developed symptoms of discolouration and wilting of leaves and died in 40 to 50 days. *B. lignicolus* was easily grown on cultures of *Botrytis cinerae, Pestalotia* sp., and several other fungi, including blue stain fungi. M.R.S.

129 MARX, D. H. Ectomycorrhizae as biological deterrents to pathogenic root infections. In *Baker, K.F.; Zentmyer, G.A.; Cowling, E.B. (Editors), Annual review of phytopathology. Volume 10.* California, USA: Annual Reviews Inc. (1972) 429-454 SBN 824313100 [En] U.S. Dept. of Agriculture, Southeastern Forest Experiment Stn., Athens, Georgia, USA.

In a section on the interaction of plant-parasitic nematodes and fungal pathogens on ectomycorrhizae, Marx reviews 10 published papers and concludes that nematodes are more important in diseases of the feeder-roots of trees than was previously thought because they can render normally resistant mycorrhizae susceptible to the fungus *Phytophthora cinnamomi*. MTF

130 MONTEIRO, A. R.; MENDONÇA, M. M. DE [*Helicotylenchus caipora* n.sp. (Nematoda, Hoplolaimidae) from forest soil in Brazil.] *Helicotylenchus caipora* n.sp. (Nematoda, Hoplolaimidae) de solo de mata do Brasil. *Revista de Agricultura, Piracicaba* (1972) 47 (3/4) 199-204 [Pt, en] Escola Superior de Agricultura "Luiz de Queiroz", Univ. de São Paulo, Piracicaba, Brazil.

*Helicotylenchus caipora* n.sp. is described and figured from males and females from virgin forest soil near Piracicaba, São Paulo State, Brazil. The new species is distinguished from *H. multicinctus* and *H. anhelicus* by its more curved body and the form of the female tail which is dorsally convex-conoid with a smooth hemispherical terminus. The vulva is located more anteriorly and in males the phasmids are more anterior to the cloaca than in *H. multicinctus*. The stylet is shorter than in *H. anhelicus*. PSG

131 MURAD, J. L. Effects of prescribed burning on population dynamics of pine forest soil nematodes. [Abstract.]. In *International Symposium of Nematology (11th). European Society of Nematologists, Reading, UK, 3-8 September, 1972. Abstracts.* (1972) 46-47 [En] Louisiana Tech. Univ., College of Life Science, Div. of Research, Ruston, Louisiana 71270, USA.

[Prolonged prescribed burning of pine forest significantly affects populations of plant-parasitic nematodes.].

132 RIFFLE, J. W. Histopathology of *Pinus ponderosa* ectomycorrhizae infected with a *Meloidogyne* species. [Abstract.]. *Phytopathology* (1972) 62 (7) 785 [En] Forest Service, Rocky Mountain Forest Range Experiment Stn., Albuquerque, New Mexico, USA.

[An undescribed *Meloidogyne* sp.].

133 –RIFFLE, J. W., 1972. "Effect of certain nematodes on the growth of *Pinus edulis* and *Juniperus monosperma* seedlings." *Journal of Nematology*, 4 (2), 91–94. [En] 5423 Federal Building, 517 Gold Avenue SW, Albuquerque, New Mexico 87101.

Seedlings of *Pinus edulis* and *Juniperus monosperma* were inoculated separately with each of 7 nematode species and grown for 9 months. Soil temperature was maintained at 20°C. *Rotylenchus pumilis, Tylenchus exiguus, Xiphinema americanum* and *Hoplolaimus galeatus* parasitized *P. edulis* seedlings but did not significantly reduce plant growth. *P. edulis* was not a host for *Tylenchorhynchus cylindricus, Aphelencoides cibolensis* or *Criconemoides humilis*. Root weights and root collar diameters of *J. monosperma* seedlings were reduced by *X. americanum* and *R. pumilis* but were not affected by *A. cibolensis* and *T. exiguus*. The relationship between *J. monosperma* and *T. cylindricus* and *C. humilis* was uncertain. C.E.S.

134 RUEHLE, J. L. Response of sand pine to parasitism by lance nematode. *Plant Disease Reporter* (1972) 56 (8) 691-692 [En] Southeastern Forest Experiment Stn., USA, Forestry Sciences Laboratory, Athens, Georgia 30601, USA.

Seedlings of Ocala and Choctawhatchee sand pines (*Pinus clausa*) infected with large numbers of *Hoplolaimus galeatus* were 26% and 18% shorter, respectively, after 4 months' growth than uninfected controls. Root weights were 45% and 54% less than the controls. GO

135 –RUEHLE, J. L., 1972. "Pathogenicity of *Xiphinema chambersi* on sweetgum." *Phytopathology*, 62 (3), 333–336. [En] Forestry Sciences Laboratory, Southeastern Forest Experiment Stn., Forest Service, USDA, Athens, Georgia 30601, USA.

In pot experiments, *Xiphinema chambersi* increased in numbers on seedlings of *Liquidambar styraciflua*, usually 2 to 3 fold in 3 months. The weight of tops and roots and height of the seedlings were all reduced by infestation. The roots showed surface necrosis, arrested growth, swelling and twisting. M.T.F.

136 –RUEHLE, J. L., 1972. "Nematodes of forest trees." In: Webster, J. M. [Editor], "Economic nematology." *London, UK: Academic Press*, pp. 312–334. [En] Forestry Sciences Laboratory, USDA, Athens, Georgia, USA.

This useful review provides information on the

effects of nematodes on tree growth in forest nurseries and plantations and methods of control (mostly chemical). Appreciation of nematodes as a cause of loss of timber production in natural woodland is still at an early stage. P.S.G.

137 VOLZ, P. **[Drought resistance, and reactivation of the microfauna (especially Protozoa) in forest soil.]** Über Trockenresistenz und Wiederaufleben der Mikrofauna (insbesondere Protozoen) des Waldbodens. *Pedobiologia* (1972) 12 (2) 156-166 [De, en] 674 Landau in der Pfalz, Ramburgstrasse 10, German Federal Republic.

A comparison was made of the effects of desiccation on different groups of fauna in forest soil. Free-living nematodes had lower critical moisture requirements and regained their activity more quickly after desiccation than protozoa. In the dry state they did not form protective cysts. MTF

138 YEATES, G. W. **Nematoda of a Danish beech forest. I. Methods and general analysis.** *Oikos* (1972) 23 (2) 178-189 [En, ru] Soil Bureau, Dept. of Scientific and Industrial Research, Private Bag, Lower Hutt, New Zealand.

The nematode fauna was examined in samples of soil and litter taken at monthly intervals during a year in an 85-year-old beech forest in Denmark. The methods of extracting the nematodes are given, that most satisfactory for the litter being the use of a homogenizer. More than 75 nematode species occurred of which about 50 were rarely found: greatest numbers occurred at a depth of 0 to 3 cm and in the period April to May. Variations in the monthly total counts, in the biomass, the numbers of gravid females and in moulting nematodes and males are discussed. The mean monthly calorific value of the nematode fauna was 796.2 cal/m² and the calorific value of the annual oxygen consumption was 10.1 Kcal/m². MTF

139 ZINNO, Y.; IGARASHI, Y. **[Distribution of plant parasitic nematodes associated with coniferous seedlings in Shikoku, Japan.]** *Bulletin of the Government Forestry Experimental Station, Tokyo* (1972) No. 246, 11-20 [Ja, en] Government Forest Experimental Stn., Meguro, Tokyo, Japan.

An extensive survey of forest nurseries in Shikoku, Japan, showed that *Pratylenchus* was the most prevalent plant-parasitic nematode. *Trichodorus* and *Helicotylenchus* were also common. *Scutellonema, Tylenchorhynchus* and *Xiphinema* were less frequent. *Cryptomeria* seedlings were usually heavily infested with *Pratylenchus. Pratylenchus coffeae* occurred mostly in coastal and lowland areas (more than 15°C annual mean temperature) and *P. penetrans* occurs mostly in high level areas (lower than 15°C). *P. coffeae* soil populations increased rapidly from late July to October, but highest root populations were seen in late August and early September. Large numbers of *P. coffeae* appeared to overwinter in root fragments. [From English summary.]. PSG

## 1973

140 HIRSCHMANN, H.; TRIANTAPHYLLOU, A. C. **Postembryogenesis of *Meloidodera floridensis* with emphasis on the development of the male.** *Journal of Nematology* (1973) 5 (3) 185-195 [En] Dept. of Plant Pathology, North Carolina State Univ., Raleigh, North Carolina 27607, USA.

Second-stage larvae of *Meloidodera floridensis* kept in tap water developed without feeding into small, slender males. They completed 3 moults, and the moulted cuticles remained superimposed. All organ systems were well developed in 3rd- and 4th-stage male larvae. Structures in the head region such as cephalic framework, stylet and oesophagus were smaller and differed morphologically from those of 2nd-stage larvae. Development of the male reproductive system was similar to that of other tylenchids, and sex was recognisable at the end of the 2nd moult. 2nd-stage larvae, developing in pine roots (*Pinus taeda*), increased in size and moulted 3 times to become ovoid to spherical females. Each larval stage had a stylet and fed actively. Sex could be determined at the end of the 2nd moult. Detailed observations were made on the development of the reproductive system, cuticle, oesophagus and tail region. [AS]. PSG

141 JOHNSON, S. R.; FERRIS, J. M.; FERRIS, V. R. **Nematode community structure in forest woodlots. II. Ordination of nematode communities.** *Journal of Nematology* (1973) 5 (2) 95-107 [En] Dept. of Entomology, Purdue Univ., Lafayette, Indiana 74907, USA.

Intersite relationships among nematode communities in 18 mixed hardwood stands in Indiana, USA, with varying plant species, soils, physiography, and past management practices were determined by community ordination techniques based on numbers of individuals of each nematode species. Relationships were found between nematode communities and the tree communities and soil types. In swamp forest communities, *Helicotylenchus platyurus* was dominant. On well-drained sites with beech/sugar-maple or oak climax communities, *Tylenchus* spp. and *Tylenchorhynchus silvaticus* were dominant. *Xiphinema americanum* was most numerous on 2 sites with poor drainage and sugar maple as the dominant tree species. No single edaphic factor explained the relationships. The results were similar to those obtained by the resemblance equation technique reported earlier (see *Hm/B 42*, 145). MTF

142 KAKULIA, G. A. [KAKULIYA, G. A. ]; MAGLAKELIDZE, L. Y. [Nematode fauna of *Hylurgops palliatus* in the Georgian SSR.] *Parazitol. Sbornik, Tbilisi* (1973) No. 3, 76-78 [Georgian, en, ru]

*Parasitorhabditis palliati, Cryptaphelenchus cryptus, Bursaphelenchus [illegible], Mikoletzkya palliati, Panagrolaimus fuchsi* and *Cephalobus persegnis* were found in *Hylurgops palliatus* and its frass on 350 specimens of *Picea orientalis* in the Borzhomy and Khashuri districts of the Georgian SSR. [From English summary]. EG

143 MAHAJAN, R. Two new nematodes, *Tylenchus kashmirensis* n.sp. (Tylenchidae) and *Dorylaimoides pari* n.sp. (Dorylaimoididae) from Kashmir, India. *Rivista di Parassitologia* (1973) 34 (3) 201-204 [En, it] Dept. of Horticulture, Punjab Agricultural Univ., Ludhiana, India.

*Tylenchus kashmirensis* n.sp. from around *Crocus sativa* roots in Kashmir, India, and *Dorylaimoides pari* n.sp. from forest soil in Kashmir are described and figured. *T. kashmirensis* is characterized by the presence of notched lips around the vulva, a stylet 14 to 15μ long, and by the twisted shape of the gubernaculum. *D. pari* is characterized by the asymmetrical stylet 5μ long, location of the dorsal oesophageal gland opening, the large bulboid cardia, the single ovary and by the tail 5 anal body-widths in length. JWS

144 NESTEROV, P. I. [New species of plant nematodes from the arctic tundra of the USSR (Yamal Peninsula).] *Izvestiya Akademii Nauk Moldavskoĭ SSR (Buletinul Akademieĭ de Shtiintse a RSS Moldovenèsht'), Biologicheskie i Khimicheskie Nauki* (1973) No. 4, 68-70 [Ru]

*Tylenchorhynchus jamalensis* n.sp. was found in tundra soil (15 cm deep) in the rhizospheres of herbaceous plants, willows and birches, on raised ground, slopes and in ravines in the Yamal Peninsula, USSR. It is differentiated from *T. lineatus* by a longer and wider glandular part of the oesophagus and, in females, by the presence of caudal cuticular ornamentation and a higher (close to the anus) position of the phasmids. Only females and larvae of *Aphelenchoides seiachicus* n.sp. were found; they occurred singly in the rhizosphere of tundra plants (5 cm deep) on top of extinct volcanoes. This species differs from *A. pusilus* by a longer stylet (9.5 μ), a low "c" value (12.6), a well defined head capsule and a wide and complex caudal mucro; from *A. asterocaudatus* and *A. besseyi* which also have a complex mucro, the new species differs in having a small body, in the de Man values and the structure of the mucro. Both new species are described and illustrated. EG

145 NORTH, D. C.; HOFFMAN, J. K. Distribution of *Helicotylenchus platyurus, Xiphinema americanum*, and *X. chambersi* as related to forest vegetation and edaphic factors. [Abstract]. In *International Congress of Plant Pathology (2nd), Minneapolis, Minnesota, September 5-12, 1973. Abstracts of papers.* St. Paul, Minnesota, USA: American Phytopathological Society Inc. (1973) No. 0558 [En] Dept. of Botany and Plant Pathology, Iowa State Univ., Ames, Iowa 50010, USA.

146 RIFFLE, J. W. Effect of two mycophagous nematodes on *Armillaria mellea* root rot of *Pinus ponderosa* seedlings. *Plant Disease Reporter* (1973) 57 (4) 355-357 [En] Rocky Mountain Forest and Range Experiment Stn., Forest Service, USDA, Albuquerque, New Mexico 87101, USA.

*Aphelenchoides cibolensis* and *A. composticola* were tested in flask cultures to determine whether they could suppress the development of *Armillaria mellea* root rot of *Pinus ponderosa*. Nematodes greatly reduced mortality due to root rot, and generally reduced seedling weight losses. Stem lengths were not affected by the nematodes or fungus, either alone or in combination. Although both nematode species apparently reduced fungal vigour or growth so that root rot development was retarded, neither killed the fungus. [AS]. CES

147 RIFFLE, J. W. Histopathology of *Pinus ponderosa* ectomycorrhizae infected with a *Meloidogyne* species. *Phytopathology* (1973) 63 (8) 1034-1040 [En] Rocky Mountain Forest and Range Experimental Stn., Forest Service USDA, Albuquerque, New Mexico 87101, USA.

An undescribed *Meloidogyne* sp. was found infecting ectomycorrhizae of mature *Pinus ponderosa* in southwestern New Mexico in 1963. Nematode larvae penetrated the ectomycorrhizae, migrated to the stelar region, and developed into adults with their heads embedded in vascular tissues. As the female developed, cortical cells and the associated Hartig net at and near its body were compressed and collapsed. Fungal mantles were ruptured, and a gelatinous matrix containing many nematode eggs protruded from the mantle surface. Giant cells developed as a cluster of multinucleate cells in the vascular tissues immediately adjacent to the head of the nematode. Cytoplasm of actively functioning giant cells was dense, very granular in texture, and contained greatly enlarged nuclei with irregularly lobed membranes. As the giant cells became senescent, their cytoplasm became highly vacuolated, deteriorated, and cavities usually appeared in vascular tissues originally occupied by the giant cells. Xylem tracheids in the immediate vicinity of the giant cells were distorted, crushed, and even scattered in irregular isolated patches. [AS]. PSG

148 RUEHLE, J. L. **Influence of plant-parasitic nematodes on longleaf pine seedlings.** *Journal of Nematology* (1973) 5 (1) 7-9 [En] Forest Service, USDA, Southeastern Forest Experiment Stn., Forestry Sciences Laboratory, Carlton Street, Athens, Georgia 30601, USA.

Seedlings of *Pinus palustris* were grown in a glasshouse for 5 to 7 months after inoculation with one of 7 species of nematode. *Belonolaimus longicaudatus* and *Helicotylenchus dihystera* had no effect on seedling growth. A significant reduction in fresh weight of roots was caused by large numbers of *Hoplolaimus galeatus* and *Tylenchorhynchus claytoni* and both root and top weights were reduced by *Meloidodera floridensis* and *Pratylenchus brachyurus*. Root growth of seedlings was stimulated by a high inoculum level of *Scutellonema brachyurum*, but it was not associated with root galling. CES

149 RUEHLE, J. L. **Nematodes and forest trees – types of damage to tree roots.** In *Baker, K.F. (Editor), Annual review of phytopathology. Volume 11.* Palo Alto, California, USA: Annual Reviews Inc. (1973) 99-118 [En] Southeastern Forest Experiment Stn., U.S.D.A. Forest Service, Forestry Sciences Laboratory, Athens, Georgia, USA.

Nematodes are associated with necrotic, hyperplastic and hypoplastic damage to forest tree roots; the damage is often non-specific and may be attributed to general root malnutrition. In balanced parasitism, prevalent in forest plantations, the pathogenic response is slow, vigorous young trees being able to overcome the root damage; only mature trees on impoverished soil, needing a more efficient root system, show symptoms of disease. Nematodes may act synergistically with, or provide means of entry for, pathogenic organisms and fungi, the nematode-fungus complex causing more damage than either separately. Mycophagous nematodes may affect the beneficial mycorrhizal symbionts in the roots, either by preventing their formation or directly attacking it. The nematodes are also vectors of NEPO viruses. EG

150 ŠÁLY, A. **[Vertical and seasonal distribution of nematodes in the soil of the Báb forest.]** Vertikálna a sezónna distribúcia nematódov v pôde Bábskeho lesa. *Biológia, Bratislava, B, (Zoológia 1)* (1973) 28 (2) 91-104 [Cs, en, ru] Prírodovedecka Fakulta Univ. Komenského, Bratislava, Czechoslovakia.

Nematodes were extracted from soil samples taken on 4 occasions during the vegetative period at 8 depths down to 120 cm in the Báb forest (oak-hornbeam), Czechoslovakia. 59 species were identified, of which 6 were new for Czechoslovakia. Numbers in the top 2 cm were affected by periodic drying of the soil; 28.6% of the total were at the 10 cm depth and numbers decreased below this until at 120 cm only 2.65% of the total occurred. Greatest numbers were found in October and fewest in August. [From English summary.]. MTF

151 SOHLENIUS, B. **Structure and dynamics of populations of *Rhabditis* (Nematoda: Rhabditidae) from forest soil.** *Pedobiologia* (1973) 13 (5) 368-375 [En, de] Zoologiska Inst., Univ. Stockholm, Rådmansgatan 70A, Box 6801, S-113 86 Stockholm, Sweden.

*Rhabditis* populations were sampled in 5 localities in central Sweden (from a mixed pine forest, an aspen forest, an arable field with wheat, of forest of *Pinus silvestris* and a forest of *Picea abies*). In the forests, *Rhabditis* constituted a small proportion of the nematode fauna (0.06 to 2.84%), whereas in arable soil it constituted a significant proportion (21.80%). The forest *Rhabditis* populations resembled old laboratory populations in that there were high proportions of dauer larvae. Enrichment of forest soil by application of organic material led to an increase in total nematode numbers. This was due mainly to a rapid increase in numbers of *Rhabditis*, as a result of growth and reproduction and to a minor extent by attraction from the surrounding soil. It is concluded that *Rhabditis* are of little significance in forest soil under ordinary conditions, but their importance as regulators of bacterial populations is increased when there are localized surges in bacterial activity due to deposition of organic water. CWG

152 TRIANTAPHYLLOU, A. C.; HIRSCHMANN, H. **Environmentally controlled sex expression in *Meloidodera floridensis*.** *Journal of Nematology* (1973) 5 (3) 181-185 [En] Dept. of Genetics, North Carolina State Univ., Raleigh, North Carolina 27607, USA.

Larvae of *Meloidodera floridensis* develop as females after feeding on pine roots, but become males under conditions of starvation. 70 to 80% of the larvae kept in tap water at 23°C for 4 months underwent one or 2 moults, developing as males, and more than 50% became adult males. 96% of the larvae that entered pine roots became females and only 4% developed as males. There is evidence that the latter did not feed on the roots. In comparison with tap water, solutions of cholesterol, testosterone propionate and $\beta$-estradiol did not significantly affect the percentage of larvae that developed into males. Larvae kept in soil without a host plant did not develop into males. Most of them exhausted their energy supply and died without undergoing any development. It is concluded that sex expression in *M. floridensis* is to a large extent controlled by environmental factors. Under natural conditions of feeding on a host plant, larvae develop as females according to their genetic constitution (thelytokous organism). Under conditions of starvation, however, sexual differentiation proceeds toward the male direction, probably as a

result of alteration of the hormonal balance of the larvae and the subsequent activation of different sites of genetic function. [AS]. PSG

153 YEATES, G. W. Nematoda of a Danish beech forest. [illegible]ion estimates. *Oikos* (1973) 24 (2) 179-185 [En, ru] Mols Laboratory, Femmpiller, Denmark.

In this second paper on the soil nematodes of a Danish beech forest the following information based on 12 monthly samples is given for the 29 commonest species: mean number and live weight/$m^2$ with percentage of both for juveniles, females, gravid females and males; percentage distribution in litter and in soil at 0 to 3 cm and at 3 to 6 cm depths; mean number/month and mean individual biomass; total increments/$m^2$ in numbers and biomass; annual oxygen consumption; calorific equivalents of annual biomass increments and oxygen consumption. The annual mean total number of nematodes/$m^2$ corrected for extraction efficiency is 1,432,000 with a biomass of 370,000 $\mu g/m^2$ and a total energy flow of 14,000 cal/$m^2$ year. Monthly values for abundance and live weight for 15 individual species are given in graphs. Total respiration and calorific equivalents of respiration and of biomass production are given. The energy flow and the annual production as a percentage of total energy flow are discussed in relation to previous estimates for nematodes and other soil invertebrates. Nematode productivity is similar to that given by previous work on Danish pasture-inhabiting nematodes but results differ from those found in Japanese forests. MTF

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154 BOAG, B. Nematodes associated with forest and woodland trees in Scotland. *Annals of Applied Biology* (1974) 77 (1) 41-50 [En] Scottish Horticultural Research Inst., Invergowrie, Dundee, DD2 5DA, UK.

A survey of the nematode genera associated with trees in Scotland showed that *Tylenchus* sensu lato, *Aphelenchoides, Tylencholaimus, Trichodorus, Helicotylenchus, Rotylenchus, Criconemoides* s.l., *Hemicriconemoides, Tylenchorhynchus, Pratylenchus* and *Paratylenchus* s.l. were commonly found in soil samples collected from around the roots of coniferous and deciduous trees. Only *Criconemoides* s.l. appeared to have a significant preference for deciduous woods. The presence of undergrowth in woods and forests was associated with significantly greater numbers of plant-parasitic nematodes. Measurements of abiotic factors indicated that, in mineral soils, *p*H affected the incidence of most genera, but soil type, moisture content and altitude had little effect. [AS]. KJGW

155 EROSHENKO, A. S. [A new nematode from coniferous forests in the Far East of the USSR.] *Parazitologiya* (1974) 8 (3) 220-222 [Ru, en] Soil Biology Inst. of the Far Eastern Centre, Academy of Sciences of USSR, Vladivostok.

*Paratylenchus abietis* n.sp. (17 females and 2 males) found in the rhizosphere of *Abies nephrolepis* in the Dal'negorsk region in USSR is described and illustrated. It is differentiated from *P. straeleni*, which it closely resembles, by the smooth cuticle of the head, the structure of the oesophageal bulb, the position of the hemizonid which is at the level of, or 2 to 3 cuticular rings in front of the excretory pore, and by better defined inner lines in the lateral field. EG

156 LANE, C. L.; WITCHER, W. A survey of the nematodes in the soils of the Hobcaw Barony. *Plant, Disease Reporter* (1974) 58 (1) 67-70 [En] Dept. of Forestry, Clemson Univ., Clemson, South Carolina 29631, USA.

An intensive, 2-year study of forest soils in the Hobcaw Barony, near Georgetown, South Carolina, USA, revealed 16 genera of stylet-bearing nematodes in 13 soils. More than half the soils are low-lying and frequently flooded, at times for several weeks, and most of the rest are old dunes which are excessively drained. *Tylenchus* and *Hemicycliophora* were present in all but 2 soils. Number of nematodes decreased markedly with increase in soil depth, almost the whole population being in the surface horizon. The type of cover did not appear to affect the genera present but did affect numbers, the greatest numbers being found under mixed pine and hardwood. The results of seasonal sampling of 6 of the soils showed differences in nematode numbers that appeared to be related to soil moisture and aeration rather than to season. Nematode numbers were greatest in the 2 soils with excessive internal drainage and in one of the wettest soils. Abundant moisture with good aeration gave the most favourable conditions for nematode multiplication. SW

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